

**An Archaeological Survey in the Clearwater River Provincial Park, Saskatchewan;
Insights into the Archaeology of the Boreal Forest of Northwestern Saskatchewan**

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By
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Keywords: Clearwater River, northwestern Saskatchewan archaeology, boreal forest
archaeology, archaeological survey, lithic analysis

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ABSTRACT

An archaeological survey was conducted in the Clearwater River Valley, Saskatchewan in the summer of 2008 by University of Saskatchewan Master's student Alan Korejbo and a crew of three. Prior to this project, only three sites had been recorded along this 55 km portion of the river. Researching this remote wilderness heritage river in the boreal ecoregion presented substantial logistical barriers; nonetheless, a total of seventeen sites, mostly precontact in nature, were discovered. The density of sites identified in this survey suggests that this region is archaeologically rich; thus, meriting future research. Information collected from this encourages vigorous archaeological resource management in the Clearwater River Provincial Park. Data from this survey may give future researchers a basis from which to start. Survey results and previous research are combined to hypothesize past land usage in northwestern Saskatchewan. Furthermore, coupled with previous research, the data from this project may allow us to suggest possible cultural influence and interaction and ask pertinent questions that may aid in future research here.

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DEDICATION

This thesis is dedicated to Mom and Dad, who both unfortunately passed on before seeing this work completed and to Louise and Kamen for their support throughout this journey.

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LIST OF ABBREVIATIONS

ATV: all terrain vehicle

aka: also known as

SARMS: Saskatchewan Archaeological Resource Management Section

BP: years before present (or) years before physics

BRS: Beaver River Sandstone

bs: below surface

cm: centimeter

FBR: fire broken rock

GPS: Global Positioning System

HBC: Hudson's Bay Company

km: kilometer

m: metre

mm: millimetre

NTS: National Topographic System

NWMt: Northwest Microblade tradition

UTM: Universal Transverse Mercator

Chapter 1: Introduction

1.1 Introduction to the Research Problem

Due to problems of poor organic preservation, a lack of stratified sites, and a paucity of archaeological work conducted in the boreal forest of the prairie provinces, culture histories and ancient land-use patterns are poorly understood in this region (Ives 1993:8; Meyer 1995:54; Reid 1988a; Hamilton 1988:38-39; Wright 1972:1). As a result, many assume that archaeological investigations in this area are inconsequential or that the area is simply archaeologically infertile compared to other regions of North America (Reid 1988b:1). My experiences working in cultural resource management in British Columbia, Alberta, and Saskatchewan have affirmed that at least some of my archaeological contemporaries carry this assumption. These generally poor attitudes toward boreal forest archaeology invariably result in a perpetually self-fulfilling prophecy of the archaeological unimportance of this area; archaeologists simply do not bother to investigate boreal forest areas with nearly the same amount of scrutiny as they would for more southerly regions of the Northern Plains, or more westerly coastal regions (Hamilton 1994:10).

Although the research approach that was originally proposed for this thesis project was not realized, the research that was conducted was molded by the limitations imposed on the original proposal and maintained some of its basic premises. The original proposal for this research was grounded on the prediction of natural occurrences of Beaver River Sandstone, an archaeological lithic material which is well represented in northeastern Alberta and northwestern Saskatchewan. It was originally proposed that by predicting alternative natural occurrences of this lithic material, important settlement patterns could also be predicted, based on the likelihood that the presence of high-quality lithic resources would shape the lifeways of the people of northwestern Saskatchewan. The area of the predicted geological occurrences of Beaver River Sandstone was between Contact Rapids and the Saskatchewan/Alberta border. Unfortunately, logistical difficulties, which will be further discussed in the methods section of this thesis, did not allow us to explore this area. The goal of this research changed from trying to answer a specific research question regarding alternative sources of Beaver River Sandstone to providing an exploratory archaeological reconnaissance of the Clearwater River Valley in the area between the Clearwater River Provincial Campground and Contact Rapids. The resultant study still keeps the original hypothesis in mind, but is more generalized, seeking to provide an inventory of some

of the archaeological resources in the Clearwater River Valley and to verify the archaeological significance of the Clearwater River Valley. Beaver River Sandstone maintains its importance to the resultant research because it is the only lithic resource for which the source location can be stated with some confidence; thus, analyzing its distribution maintains some utility.

1.2 Research Objective

Although certain portions of the northern Saskatchewan boreal forest have received significant archaeological investigation, such as portions of the the Churchill River system (Meyer 1995, Millar 1997), Black Lake (Minni 1975), and Lake Athabasca (Wright 1975), much more still needs to be done before we can achieve a better understanding of the prehistory of northern Saskatchewan. This current research is an attempt to increase our knowledge of northwestern Saskatchewan by surveying a portion of the Clearwater River Valley thereby increasing the archaeological inventory here. An important primary goal in relatively unknown archaeological regions is to understand its culture history, which is also a goal of this research. I also hope to gain some knowledge of the lifeways of the past cultures that once resided in this region. By integrating this research within the broader geographical area of northern Saskatchewan, I hope that at least a slightly better understanding of the precontact archaeology there will be achieved. This thesis will hopefully encourage future research here as well as help to preserve the valuable archaeological resources in northern Saskatchewan.

1.3 Organization of the Thesis

The general organization of this thesis will follow the following structure. Chapter one is an introduction to the general research problem, the research objective, and thesis organization. Chapter two provides basic background information about the natural environment of the Clearwater River area, both past and present. This chapter also discusses what is known of the lithic resources that were important to past inhabitants of this valley. Chapter three analyses previous research that is relevant to understanding the culture history of the Clearwater River Valley. This previous research is synthesized to provide a general culture history of northwestern Saskatchewan. Chapter four outlines the survey and laboratory methodology that was employed in the current research. Chapter five provides the results of the survey. Chapter six is a more thorough analysis of the artifacts as well as an analysis of lithic raw material use

throughout our survey area. Chapter seven will provide summary, discussion, and concluding statements.

CHAPTER 2: NATURAL ENVIRONMENT BACKGROUND

2.1 Introduction

The environment provides hunter-gatherers with the means for survival and greatly influences them; however, the relationship between culture and environment is far from a simple or direct one (Barth 1969:362; Hames 2010:110). As will be further discussed in the next chapter, the relative lack of archaeological research in northwestern Saskatchewan is problematic when one tries to understand the cultural lifeways of its previous inhabitants. Human behavior is complex; nonetheless, understanding environmental factors may provide an initial step in understanding the conditions to which people have to adapt.

This chapter is organized into four major sections. First is the physical placement of the Clearwater River. The second is the biological environment, i.e., the plants and animals, with a focus on large migratory mammals such as barren-ground caribou and bison, which would be a major resource influence of the area. The third is the geological environment, which includes important lithic resources and where these resources are likely to be found. Fourth is past environmental factors such as glaciation and Glacial Lake Agassiz.

2.2 Geographical location

The Clearwater River is located about 700 km northwest of Saskatoon. The nearest town, La Loche, Saskatchewan is about 65 km south of the river (Figure 2.1a; Parks Branch 1986:2). The entire river spans 295 km (Canadian Heritage Rivers System 1997:1), beginning at Broach Lake, Saskatchewan, and eventually flowing into the Athabasca River at Fort McMurray, Alberta.

The Clearwater River and the Methye Portage serve as an important connection linking the Mackenzie River system that flows to the Arctic, and the Churchill River system that flows to the Atlantic (Figure 2.1a; Canadian Heritage River System 1997:1; Parker 1987:6, 14, 28; Steer 1977). The Clearwater River itself is a part of the Mackenzie River System. This strategic location made this river system an important travel corridor during the Fur Trade and also undoubtedly important during precontact times (Canadian Heritage River System 1997:1). The resources within the Clearwater River Valley itself would have also been attractive, making it not only a travel corridor, but a destination in itself.



Figure 2.1a

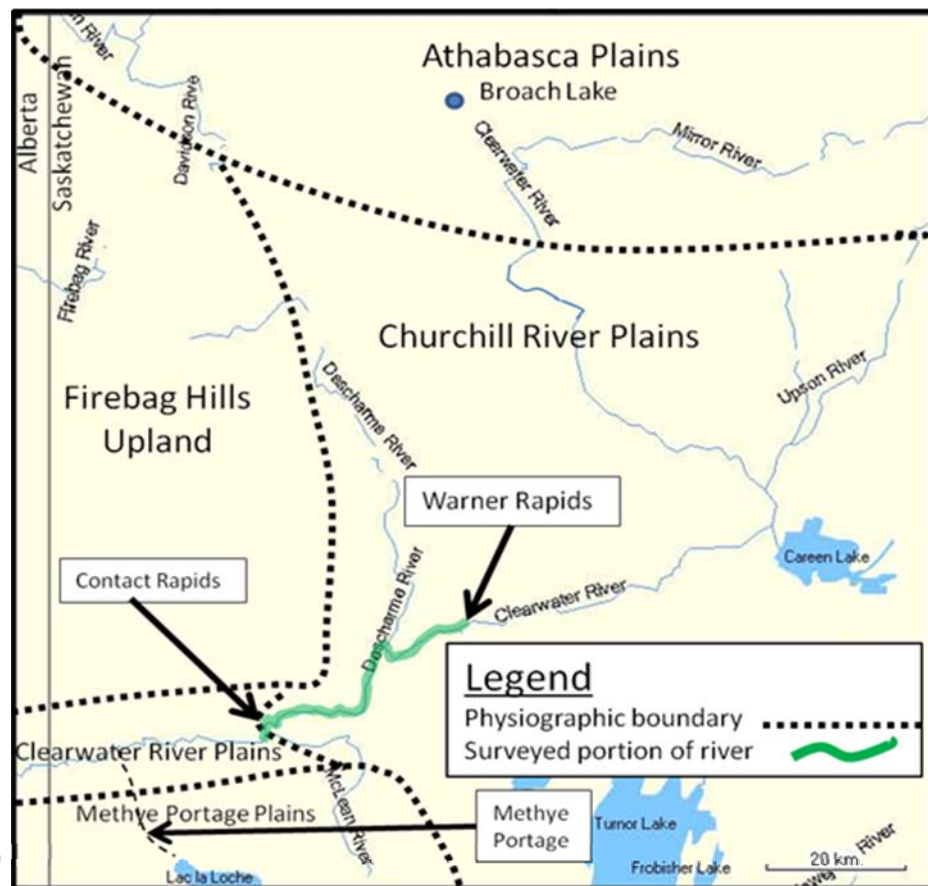


Figure 2.1b

Figures 2.1a and 2.1b. Map of study area (after Garmin International Inc.).

2.3 Present Climate

The Clearwater River Valley has a micro-climate that is more humid than the surrounding area because of nightly fogs, above-average yearly rainfall and increased surface temperatures on southward-facing slopes (Christopher et al. 1975:56; Johnson and Weichel 1982:7). The Saskatchewan portion of the Clearwater River Valley flows through two ecoregions: the Mid-Boreal Upland Ecoregion, and the Churchill River Upland Ecoregion (Acton et al. 1998:61, 66-67, 78, 82-84). These regions have a subarctic climate generally characterized by cool and short summers and cold and long winters (Acton et al. 1998:62, 79; Johnson and Weichel 1982:ii, 6). The spring and fall seasons can be quite short (Johnson and Weichel 1982:6). The mean annual daily temperature for the Mid-Boreal Upland Ecoregion is 0.3° C, and 2.3° C for the Churchill River Upland Ecoregion, with the July summer daily mean temperature being about 16° C for both regions and the January winter daily mean being -18.9° C and -24° C, respectively (Acton et al. 1998:62, 79). Frost is possible all year round (Johnson and Weichel 1982:6), with the Mid-Boreal Upland Ecoregion having an average of 91 frost free days and the Churchill River Upland Ecoregion having an average of 94 days frost free. The mean amount of yearly precipitation for the Mid-Boreal Upland Ecoregion is 452 mm, with the majority of the precipitation, 291 mm, falling in the form of rain between May and September. The mean amount of yearly precipitation for the Churchill River Upland Ecoregion is 528 mm, with the majority of precipitation, 318 mm, falling in the form of rain between May and September.

2.4 Flora

From its origin at Broach Lake to Contact Rapids (Figure 2.1a and Figure 2.1b), the river flows through open pine woodland composed of Jack pine (*Pinus banksiana* Lamb) with little or no undergrowth (Figure 2.2; Acton et al. 1998:46; Juurand 1974:12-13). From Contact Rapids to the Alberta border (Figure 2.1b), the flora changes and the valley floor vegetation is typical of transitional mixed wood and northern coniferous boreal forest (Acton 1962:3), composed of trembling aspen (*Populus tremuloides* Michx), Jack pine, black spruce (*Picea mariana*), white spruce (*Picea glauca*), balsam poplar (*Populus balsamifera*), balsam fir (*Abies balsamea*), paper birch (*Betula papyrifera* Marsh) and larch (*Larix laricina*) (Acton et al. 1998:80; Johnson and Weichel 1982:14-15). The valley walls, especially those facing south, have less dense forest

cover. Portions are covered with drought resistant grasses and herbaceous plants that are typical of northern Canadian tundra, as well as woodland grass species that are typical of more southerly grasslands (Johnson 1989:91-92). These relict grass species have remained in the Clearwater River Valley long after their respective ecozones migrated to their present geographical positions away from the Clearwater River Valley (Johnson 1989).



Figure 2.2. Typical open pine woodland forest, Gould Rapids portage.

The forest understory includes a plethora of low, medium and tall shrub species and flowers, including green alder (*Alnus crispa*), river alder (*Alnus rugosa*), pin cherry (*Prunus pensylvanica*), blueberry (*Vaccinium myrtilloides*), Canada buffaloberry (*Shepherdia Canadensis*), prickly rose (*Rosa acicularis*), Labrador tea (*Ledum*), Saskatoon berry (*Amelanchier alnifolia*), low-bush cranberry (*Viburnum edule*), snowberry (*Symphoricarpos albus*), dogwood (*Cornus alba*), currants (*Ribes*), honeysuckle (*Lonicera dioica* var.

glaucescens), sweet gale (*Myrica gale*), buckthorn (*Rhamnus alnifolia*), leather leaf (*Chamaedaphne calyculata*), bog laurel (*Kalmia polifolia*), willows (*Salix*), bearberry (*Arctostaphylos uva-ursi*), dry-ground cranberry (*Vaccinium vitis-idaea*), swamp cranberry (*Oxycoccus palustris*), twinflower (*Linnaea borealis* var. *americana*), scrub birch (*Betula glandulosa*) (Johnson and Weichel 1982:14-15), strawberry (*Fragaria*) and raspberry (*Rubus idaeus*) (Korejbo and Seidel 2009). Herbs that may be encountered are wild sarsaparilla (*Aralia nudicaulis*), bunch-berry (*Cornus canadensis*), fireweed (*Epilobium angustifolium*), three-toothed cinquefoil (*Potentilla tridentata*), three-toothed saxifrage (*Saxifraga tricuspidata*), harebell (*Campanula rotundifolia*), wild lily-of-the-valley (*Maianthemum*), northern comandra (*Comandra livida* Rich), northern bedstraw (*Galium boreale*), aster (*Aster*), tall lung-wort (*Mertensia paniculata*), dewberry (*Rubus pubescens*), bishop's-cap (*Mitella nuda*), horsetail (*Equisetum*), silverweed (*Potentilla anserina*), mint (*Mentha arvensis*), marsh skullcap (*Scutellaria galericulata*), palmate-leaved colt's-foot (*Petasites palmatus*), cloudberry (*Rubus chamaemorus*), willow-herb (*Epilobium*), buck-bean (*Menyanthes trifoliata*), sundew (*Drosera*), marsh cinque-foil (*Potentilla palustris*), marsh-marigold (*Caltha palustris*) (Johnson and Weichel 1982:14-15), cow parsnip (*Heracleum lanatum*) and northern water-horehound (*Lycopus uniflorus*) (Korejbo and Seidel 2009). Graminoids (grasses) include mountain rice (*Oryzopsis asperifolia* Michx), upland sedges (*Carex*), sedges (*Carex*), hairy wild rye (*Elymus innovatus* Beal), slender wheat grass (*Agropyron trachycaulum*), reed grass (*Calamagrostis*), and cotton-grasses (*Eriophorum*) (Johnson and Weichel 1982:14-15).

Plants found in the shallow water and near the shore are bulrush (*Scirpus*), swamp horsetail (*Equisetum fluviatile*), sedges (*Carex*), northern manna grass (*Glyceria borealis*), water hemlock (*Cicuta mackenzieana*), water-parsnip (*Sium suave* Walt), spike-rush (*Eleocharis*), wild rice (*Zizania aquatica*), cattail (*Typha latifolia*), yellow pond-lily (*Nuphar variegatum* Engelm), pondweeds (*Potamogeton*), bur-reeds (*Sparganium*), coontail (*Ceratophyllum demersum*), bladderwort (*Utricularia*), mare's tail (*Hippuris vulgaris*), arrowhead (*Sagittaria cuneata* Sheld), duckweed (*Lemna*) and water calla (*Calla palustris*) (Johnson and Weichel 1982:15). Lichens and mosses found here are Cladonia lichens (Cladoniaceae family – some of which are commonly referred to as reindeer lichen) and crustose and foliose lichens (saxicolous lichens), mosses (Musci class), and Sphagnum mosses (*Spagnum*) (Johnson and Weichel 1982:14-15).

2.5 Fauna

There are three important habitats concerning fauna in this area: uplands; wetlands and shores; and streams, rivers, and lakes (Johnson and Weichel 1982:12). Common larger mammals in the uplands area are black bear (*Ursus americanus*) and moose (*Alces alces*) (Johnson and Weichel 1982:12). Mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), woodland caribou (*Rangifer tarandus caribou*), and barren-ground caribou (*Rangifer tarandus groenlandicus*) can also be found in the Clearwater River area (Johnson and Weichel 1982:12; Pollock 1978:7-8). Historically, the area was populated by wood bison (*Bison bison athabasca*), elk (*Cervus elaphus*), and grizzly bear (*Ursus arctos*) (Johnson and Weichel 1982:12; Pollock 1978:7-8). Because caribou and bison were the predominant large mammals existing in the Clearwater River Valley throughout its ten-thousand year prehistory, it is likely that both mammals were an important resource for past human populations in this portion of the circumpolar region (Gordon 1996; Miller et al. 2007:69-70; Minni 1975:79, 82, 84; Pollock 1978:10; Steer 1977:14). They will be further elaborated on in subsequent sections of this chapter. Snowshoe hare (*Lepus americanus*), porcupine (*Erethizon dorsatum*), ruffed and spruce grouse (*Bonasa umbellus* and *Canachites canadensis*), lynx (*Lynx lynx*), red fox (*Vulpes vulpes*), coyote (*Canis latrans*) and grey wolf (*Canis lupus*) are also common smaller mammals (Johnson and Weichel 1982:12; Pollock 1978:7-8). Muskrat (*Ondatra zibethicus*), beaver (*Castor canadensis*), river otter (*Lontra canadensis*), long-billed marsh wren (*Cistothorus palustris*), mallard (*Anas platyrhynchos*) and ring-necked duck (*Anas collaris*) are plentiful in the wetlands and shores (Johnson and Weichel 1982:12). Larger fish that are found in the Clearwater River are lake trout (*Salvelinus namaycush*), northern pike (*Esox lucius*), lake whitefish (*Coregonus clupeaformis*), walleye (*Stizostedion vitreum*), cisco (*Coregonus artedii*), burbot (*Lota lota*), yellow perch (*Perca flavescens*), and arctic grayling (*Thymallus arcticus*) (Johnson and Weichel 1982:12; Pollock 1978:11).

2.5.1 Barren-ground caribou (*Rangifer tarandus groenlandicus*)

Barren-ground caribou were an important resource to the ancestral Chipewyan people (Athabasca Chipewyan First Nation 2003a:32, 34; Burch 1991:440; Gordon 1996; Gulig 2002:352; Sharp 1977; Smith 1998:418; 2004:73), and as mentioned previously in this chapter, were likely of importance to people responsible for previous archaeological cultures here.

Gordon's 1996 research has previously established the relationship between occurrences of the oldest Taltheilei sites and the Beverly Caribou range. Three separate, but overlapping barren-ground caribou herds migrate into northern Saskatchewan: the Bathurst herd, the Beverly herd, and the Qamanirjuaq herd (Figure 2.3). The Bathurst herd's southernmost range extends into the furthest corner of northwestern Saskatchewan, reaching the north shores of Lake Athabasca, and the Qamanirjuaq herd's southernmost range includes the furthest northeast corner of Saskatchewan (Beverly and Qamanirjuaq Caribou Management Board 1999:4; Kendrick et al. 2005:179; Northwest Territories Environment and Natural Resources 2010). While all three of these herds may have ranged in our study area during some period of the distant past, the range of the Beverly herd seems likely to have had the most significant influence over the archaeological cultures in the Clearwater River Valley.

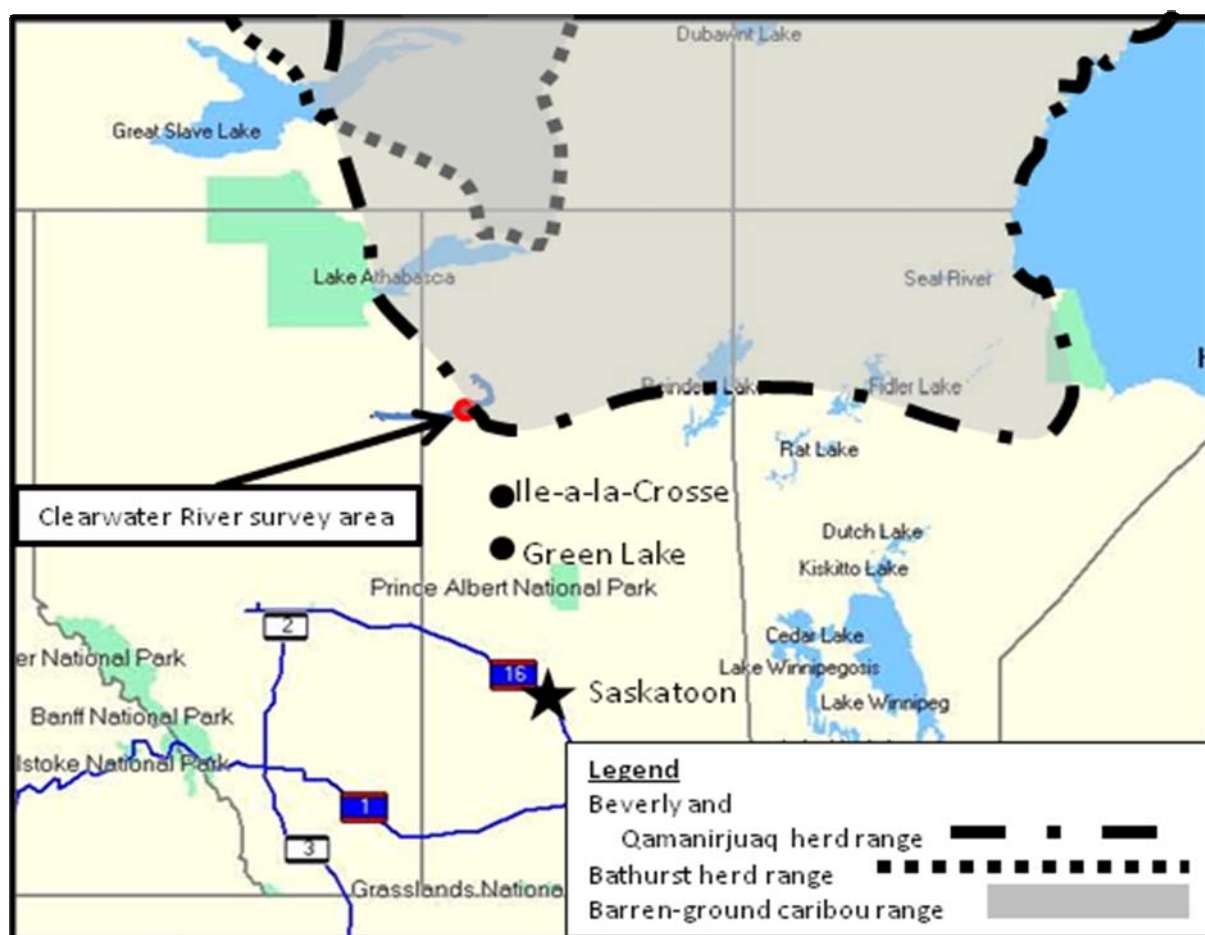


Figure 2.3. Traditional Beverly and Qamanirjuaq caribou ranges (Adapted from Beverly and Qamanirjuaq Caribou Management Board 1999:4; Kendrick et al. 2005:179; Northwest Territories Environment and Natural Resources 2010; after Garmin International Inc.).

The southwestern limit of the Beverly Caribou herd range, based on government surveys from 1957 to 1994, includes the entire northern portion of the Clearwater River to a point about 20 km to 30 km upstream from HfOf-4, which is the eastern most portion of our survey area (Beverly and Qamanirjuaq Caribou Management Board 1999:i, 4, 34; Gulig 2002:340). Oral histories collected from Dené people living in northern Saskatchewan suggest that this southwestern range determined by biologists may be too conservative, and that barren-ground caribou may have migrated even further south, to as far as Ile-a-la-Crosse (Figure 2.3; Holland and Kkailther 2003:130) and possibly even as far south as Green Lake in the past (Figure 2.3; Millar 2009:21).

It is important to note that, although there is some predictability with barren-ground caribou migration timing, routes and ranges, as a whole there is much variability in caribou behavior (Beverly and Qamanirjuaq Caribou Management Board 1999:9, 13; Sharp 1978:62). Factors such as depth of snow, roads, the timing of spring break-up (Beverly and Qamanirjuaq Caribou Management Board 1999:9, 15), forest fires (Gulig 2002; Kendrick et al. 2005:183) and population numbers (Beverly and Qamanirjuaq Caribou Management Board 1999:5) have a great effect on barren-ground caribou. Specifically, fire and population numbers have likely affected the southernmost range of the caribou. Although fire is seen as an important part of the ecosystem of the boreal forest (Gulig 2002:335; MacDonald et al. 1991:53; Nesbitt and Adamczewski 2009:19), the severity of the forest fires started by mineral prospectors in the early part of the twentieth century in northern Saskatchewan were unprecedented (Gulig 2002:340, 342, 344). It has been suggested that these fires altered barren-ground caribou migrations, with the caribou discontinuing use of their southernmost ranges after this period of excessive burning (Gulig 2002:342). The southernmost range has also likely shrunk due to a decrease of the herd's overall population numbers (Beverly and Qamanirjuaq Caribou Management Board 1999:5). The likelihood that barren-ground caribou ranged the entirety of our portion of the Clearwater River during portions of the past is high. The presence of these herds would have attracted people dependent on caribou. Because of this, a discussion of caribou behavior may help us understand the people that once lived there.

In general, bred caribou cows return to their specific herd area to calve, most likely due to phylogenetic imprinting (Gordon 1996:9; see Williams 1995:19 for an exception). Gordon

further suggests that these calving areas have remained unchanged for thousands of years (1996:12). The Beverly herd calving ground is just north of the Thelon River and Beverly Lake (Beverly and Qamanirjuaq Caribou Management Board 1999:27; Nesbitt and Adamczewski 2009:11; Williams 1995:4-5). The Qamanirjuaq herd calving area is south of Baker Lake and just east of Rankin Inlet on Hudson Bay (Beverly and Qamanirjuaq Caribou Management Board 1999:27). The Bathurst herd calving area is just west of the Bathurst Inlet (Nesbitt and Adamczewski 2009:7). The calving area of all three herds is in the Barrenlands of what is now Nunavut Territory. These calving areas constitute the northern portions of each herd's range.

Because the caribou herd that most affects this study area is the Beverly herd, the dates that will be used for the caribou lifecycle will reflect the specific timing and location of that herd; however, the timing of the Beverly herd will also loosely coincide with the timing of the Qamanirjuaq and Bathurst herds and can be used as a proxy for overall caribou lifecycle behavior. The timing of calving for the Beverly herd occurs in very late May to mid-June, with the majority of calves being born during the first two weeks in June (Beverly and Qamanirjuaq Caribou Management Board 1999:8, 10; Duquette 1985:13; Miller 2003:971; Sharp 1978:59). After calving, about middle to late June, caribou bulls aggregate with the cows (Beverly and Qamanirjuaq Caribou Management Board 1999:8, 10; Duquette 1985:19; Gordon 1996:9). This aggregation functions to reduce the harassment from mosquitoes and other insects and predation from wolves (Beverly and Qamanirjuaq Caribou Management Board 1999:8, 10). By about the end of July, the aggregated caribou begin migrating to the south toward the tree line. Caribou density is very high, especially at water crossings during this time (Beverly and Qamanirjuaq Caribou Management Board 1999:13). In August, mosquito harassment decreases, but warble flies and nose bot harassment increases, causing the caribou to scatter, and sometimes causes them to head back towards the calving grounds (Beverly and Qamanirjuaq Caribou Management Board 1999:8, 10). The southward migration towards the forest continues in the fall, sometime between September and October, with the fall rut usually occurring around late October (Miller 2003:971) near the tree line (Beverly and Qamanirjuaq Caribou Management Board 1999:8, 10). Bulls separate into rutting sub-herds at this point (Gordon 1996:9-10). Although their migration routes are somewhat unpredictable (Burch 1972:352, 346, 355, 358-359, 366; Blehr 1991:444; Duquette 1985:25), caribou often reuse particular river and lake crossing locations during their migrations (Beverly and Qamanirjuaq Caribou Management Board 1999:11; Duquette 1985:25).

By November, the majority of the herd is within the transitional forest (Beverly and Qamanirjuaq Caribou Management Board 1999:8). The caribou sub-herds aggregate again in their winter range (Gordon 1996:10) which constitutes the southernmost portion of their range.

2.5.2 Bison (*Bison bison*)

Historically, bison were very important to the livelihoods of European Canadian fur traders and indigenous people of the region (Ferguson 1993; Fidler 1934:500). Historically, our survey region would have been in the range of wood bison; however, at some time during the past, the Clearwater River was likely within the northern range of the Plains bison as well. Because, in general, bison have been removed from their natural range, much of what we know of bison numbers, range and behavior owes to historical documentation, paleontological evidence, and the direct observation of bison in ecological parks (Burns 1996; Ferguson 1993; Larter and Gates 1994; Lueck 2002:S609, S621, S648; MacDonald and McLeod 1996; Morgan 1980; Parker 1987; Pollack 1978; Soper 1941; Wilson et al. 2008). With the caveat that these limited observations are the source of some uncertainty, the following information is offered.

It is thought that the genus *Bison* initially entered North America by the early to middle Pleistocene (Reynolds et al. 2003:1011). Various forms of bison have made up an important part of the fauna of northwestern North America and Siberia for the last 400,000 years (Reynolds et al. 2003:1009). By about 5,000 BP the two subspecies of bison in North America, Plains bison (*Bison bison bison*) and wood bison (*Bison bison athabasca*), were discernable (Gates et al. 2000). Together, the two subspecies are known as American bison (*Bison bison*) (Gates et al. 2000; Reynolds et al. 2003:1009). Early estimations of bison population numbers in North America before European contact have been as high as 40 to 75 million (Campbell et al. 1994:361; Keith and Reynolds 1994; Roe 1970:505); however, more current research has suggested that these numbers are much too high, and it is most likely that there were no more than 30 million (Isenberg 2000:12; Lott 2002:69).

The original range of American bison (Figure 2.4) covered a large portion of the interior of North America from north central Mexico to the Beaufort Sea in the Yukon and Northwest Territories, including much of Alaska and northeastern British Columbia, the entirety of Alberta, southern Saskatchewan, and the western half of northwestern Saskatchewan (Harper and Gates 2000:916; Hall and Kelson 1959:1025; Reynolds et al. 2003:1012-1013; Roe 1970:supplemental

map), which includes our study area (Figure 2.4). Wood bison occupied the upper portions of this range, while Plains bison occupied the southern portions. Historic accounts (Ferguson 1993:69, 75; Parker 1987:55; Pollock 1978:8) and the oral histories of local First Nations also support the existence of bison in, or close to, our study area (Holland 2002:42, 90). The most commonly acknowledged boundary between wood bison and Plains bison in Saskatchewan is at approximately 55° latitude on the western side of the province, which is near Cold Lake, and approximately 54° on the eastern side of the province, which is just north of the town of Hudson Bay (Figure 2.4; Keith and Reynolds 1994; Lott 2002:71; Reynolds et al. 2003:1012). This would be about 250 km south of our study area; however, some researchers believe that at least southern parts of the Clearwater River Valley (Johnson 1989:87; McDonald 1981:103; Meagher 1986:3) or perhaps even the entirety of the river (Hall and Kelson 1959:1025; Sanderson et al. 2008:256) may have been within the original range of migratory Plains bison.

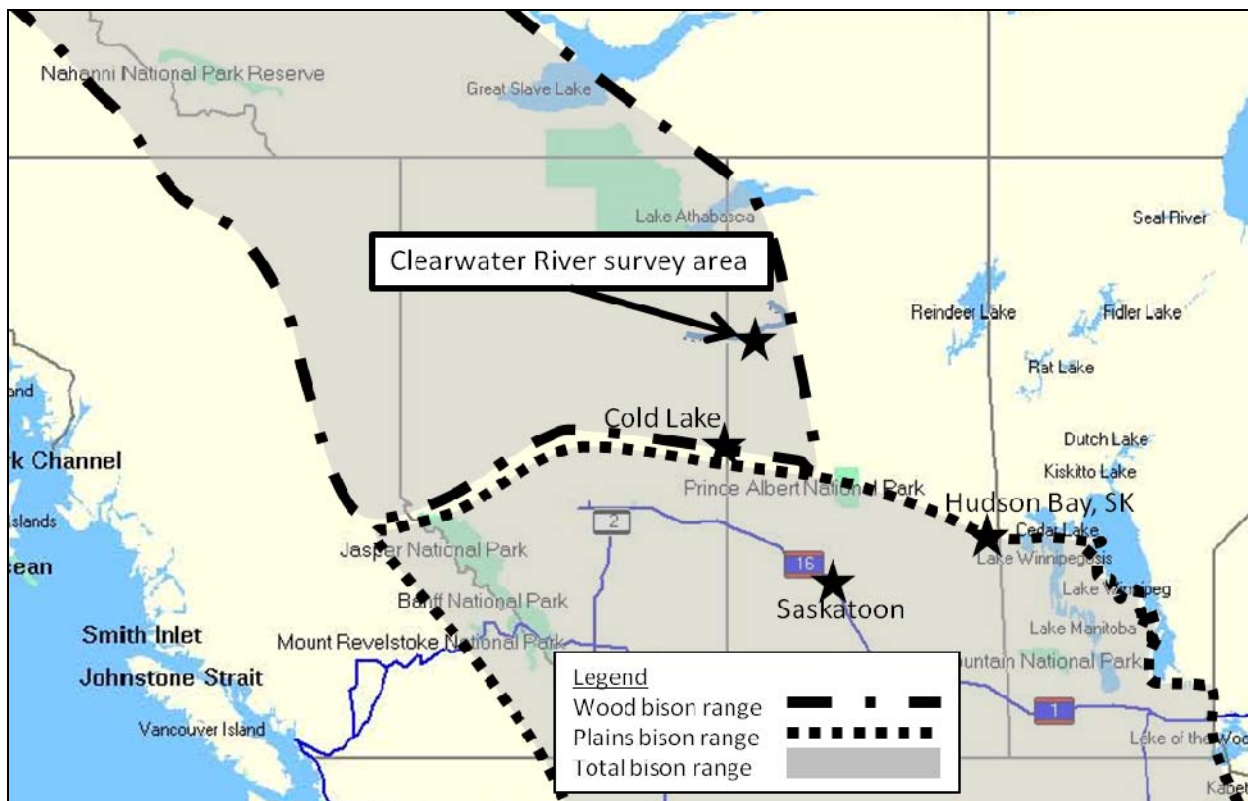


Figure 2.4. Original American bison range (Reynolds et al. 2003:1012; after Garmin International Inc.).

Relict woodland grasses found along the foot of the south facing valley wall in some portions of the Clearwater River Valley suggest that a northern advancement of the Plains ecoregion came quite close to the Clearwater River Valley at some point in the past, most likely during the Hypsithermal climatic event (Johnson 1989:88, 92). Plains bison range would have expanded, following the northward advancement of the prairie ecozone during this time. The Clearwater River Valley would have provided additional protection from extreme winter weather, which would have attracted Plains bison wintering in the area. The existence of relict meadows of grasses that are characteristic of more southern ecoregions makes likely the presence of Plains bison. Migrating bison herds from the south may have facilitated the presence of southern grasses in the Clearwater River Valley in two ways: first, by suppressing the establishment and growth of trees, thereby providing a suitable environment for grasses (Campbell et al. 1994), and secondly, by redistributing these southern grass seeds to more northern locales through their feces.

American bison are gregarious (Meagher 1986:6), although the wood bison subspecies generally forming smaller herds than Plains bison (Reynolds et al. 2003:1021). This difference in herd size may be due more to environmental factors, such as the availability of feed, than to genetic differences (Reynolds et al. 2003:1021). It is likely that bison in North America have been migratory since the end of the Pleistocene or early Holocene (Wilson et al. 2008:853); however, this distinction is generally only given to Plains bison (Gates et al. 2000; Reynolds et al. 2003:1011,1012). This being said, wood bison also display mass movements from summer ranges to winter ranges (Larter and Gates 1994:148; Morgan 1980; Pollock 1978:9, 10) that seem at least somewhat similar to the migratory movements of Plains bison. A seemingly major difference between the two subspecies is the size of range, with the Plains bison having a much larger range than the wood bison (Keith and Reynolds 1994). Again, this difference may also be due to environmental factors rather than genetic factors. In Saskatchewan, annual movements of free-ranging Plains bison would have been in a north and south direction (Morgan 1980:150, 152, 155, 156, 157).

During the precontact era, Plains bison in Saskatchewan would have wintered in the more northerly regions of their range and spent the summer in the more southerly parts of their range (Morgan 1980:150, 157). Major annual bison movements occurred late April to early May when bison moved from their winter range to their summer range (Morgan 1980:151, 154). The

calving period for American bison occurred during this movement and spanned April to early June (Soper 1941:378, 384), usually peaking in May (Reynolds et al. 2003:1027) or June (Keith and Reynolds 1994). The calving season for more northerly herds occurred slightly later than for more southerly herds, likely as a result of differences in light and climate (Reynolds et al. 2003:1027). Wood bison seem to have preferred calving areas in well-elevated woodland prairie areas (Soper 1941:378, 385). Because of the similarities in behavior between the two bison subspecies, it is likely that Plains bison also had preferred calving ranges/areas. Although pregnant cows remained in large herds during this period, pregnant cows often wandered away from the herd to calve, but this was not always the case and some calves were born within the herd (Reynolds et al. 2003:1021, 1027). Once in their summer range, bison herds began to disperse, most likely because of the poorer forage productivity there (Morgan 1980:143, 151, 152). Rut usually occurred between July and October, peaking between late July and mid-August (Reynolds et al. 2003:1025). Both cows and bulls first began to aggregate into sub-herds at the beginning of rut before they joined into larger unified herds (Morgan 1980:153). At the end of rut, dispersal into smaller sub-herds occurred again (Morgan 1980:153). During the latter half of August to September, bison began a seasonal movement to their wintering area and were absent from their summer range by October (Morgan 1980:153). This movement was most likely a response to deteriorating forage quality and a lessened availability of water in their southern range and better conditions in their northern range (Morgan 1980:153). Usually by late September, the bison had formed large aggregations in their winter range (Morgan 1980:154). Morgan suggests that their winter ranges were specific and somewhat predictable (1980:154). While in their winter range, bison may have been forced into sheltered areas (Morgan 1980:154, 155, 156). The Clearwater River Valley was likely a prime bison winter habitat for this reason (Pollock 1978:9).

2.6 Physiography

The Saskatchewan portion of the Clearwater River runs through three physiographic areas: the Athabasca Plains, the Churchill River Plains, and the Clearwater Plains (Figure 2.1b; Acton 1962:2-3; Acton et al. 1998:73). Two physiographic areas that are adjacent to the Clearwater River Valley are the Fire Bag Hills Upland to the north, and the Methye Portage Plain to the south (Figure 2.1b; Acton 1962:Figure 1; Acton et al. 1998:73). Contact Rapids is

the boundary between the Churchill River Plains and the Clearwater Plains (Juurand 1974:13). This boundary is important regarding the characteristics of the river itself. The portions of this river above Contact Rapids (Figure 2.1b) in the Churchill River Plains are characterized by a steep gradient, rocky terrain and extreme whitewater, while the lower portions that lie in the Clearwater Plains are relatively level and calm (Parks Branch 1986:5).

2.7 Bedrock geology

The Clearwater River is a glacial melt water channel that was created from at least two major outflow events from the northwest outlet of Glacial Lake Agassiz (Figure 2.5). Because Glacial Lake Agassiz would have had a huge influence on the earliest people in this area, it will be discussed further later on in this chapter. The Clearwater River Valley has cut through Pleistocene, Cretaceous and Devonian geological layers and into Precambrian levels (Christopher et al. 1975:56-57; Patterson et al. 1978). Exposures of all of these geological levels have been observed in areas immediately downstream of our study area (Patterson et al. 1978) and are also likely found further upstream. These exposures would have allowed precontact people access to the important lithic resources in those geological strata.

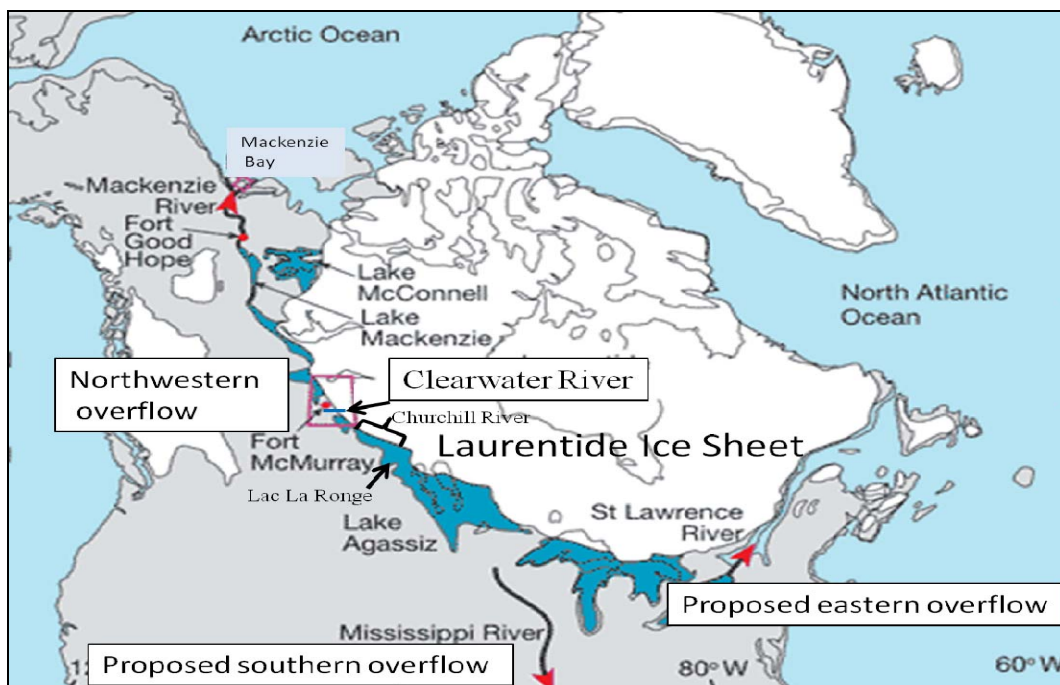


Figure 2.5. Lake Agassiz outflow and positioning of the Laurentide glacier ~ 10,000 BP (Adapted from Murton et al. 2010:Figure 1).

The Devonian levels are, from oldest to most recent, the La Loche Formation (aka Granite Wash Formation), the Contact Rapids Formation (aka McLean River Formation), and the Methye Formation (aka Winnipegosis Formation) (Patterson et al. 1978:8-9). The combined thickness of Devonian geological levels is from about 41 m to 37.5 m (Figure 2.6; Patterson et al. 1978:8-9). Limestone, argillaceous limestone, and calcareous shale characterize this formation (Tsang 1998:11). Cretaceous levels, from oldest to most recent, are the McMurray Formation, which is divided into a lower, middle and upper member (Figure 2.6; Fenton and Ives 1984:130), the Clearwater Formation and the Grand Rapids Formation (Patterson et al. 1978:11-13). The lower McMurray Formation is also known as the Dina Formation among Saskatchewan geologists. The combined thickness of the Cretaceous levels is about 20 m to 40 m (Patterson et al. 1978:11-14). The approximately 15 m of Quaternary deposits are dominated by glaciolacustrine and glaciofluvial sediment which overlay Cretaceous levels and extends to the present surface (Figure 2.6; Fenton and Ives 1990:126; Patterson et al. 1978:13).

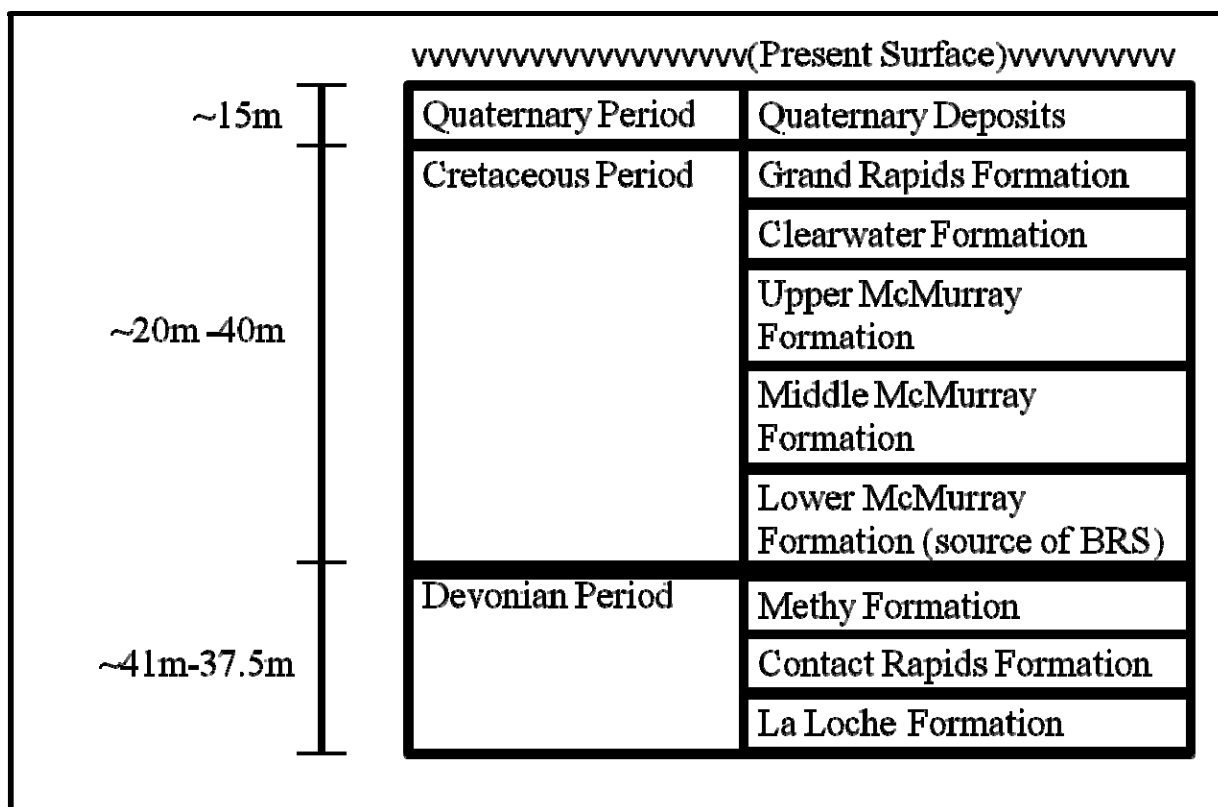


Figure 2.6. Geological Stratigraphy of the Clearwater River Valley.

2.8 Lithic materials

The results of this and other research suggest that at least five lithic materials were of importance to precontact people in this area: Beaver River Sandstone, quartz, quartzite, chert, and mudstone (Finnegan 2007:iii, 5; Hanna 1982:25, and elsewhere; Hanna 2008:51-52; Meyer 2010:16, 20, 23, 26-27; Somer et al. 2009:358). The evidence for this and detailed descriptions of each material found in this research will follow in the results section. Although the same geological unit that is responsible for Beaver River Sandstone in the Fort MacKay region of Alberta is also present in our survey area, there appears to be no primary local source of this lithic material available there.

2.8.1 Beaver River Sandstone

Beaver River Sandstone is a common lithic material found in many sites in the Athabasca River Valley downstream from Fort McMurray (Saxberg and Reeves 2003): the Clearwater River Valley (Figure 2.1a; Pollock 1978; this study); the Dillon area (Young 2006:267-269) including the Lockwood Site (GjOh-1) (personal observation), Dillon River site (GkOg-1) (personal observation), and McKusker Lake site (GhOe-1) (personal observation); near La Loche at the Old Airport site (HcOi-1) (Hanna 1982:20-59) and Saleski Lake site (HeOi-2) (personal observation); and at sites in and around Buffalo Narrows (Millar 1997:121 and elsewhere). Beaver River Sandstone is represented at 6 of the 13 lithic sites located in this research, making up as much as 38% of the lithic material found in site assemblages. It is interesting to note that there was no Beaver River Sandstone found immediately upriver from our survey area during research performed by Meyer (2010:26); however, it is important to note that his survey was not intense, and future research downstream from my survey area may find occurrences of Beaver River Sandstone artifacts.

Beaver River Sandstone was originally formally named Beaver Creek Quartzite in 1974 (Syncrude 1974), but is also known by other names including Beaver River Silicified Sandstone (Saxberg and Reeves 2003), Beaver River Silicified Limestone (Axys Environmental Consulting 2005:10-8), Muskeg Valley Silicified Limestone (Young 2006:266-269, and Muskeg Valley Microquartzite (De Paoli 2007). This material was named Beaver River Sandstone in 1982 by Fenton and Ives and this remains the most commonly used name for this lithic resource (e.g., Abercrombie and Feng 1997; Brumley 1990:62; Chandler 2006; Fedirchuk and McCullough

1992; Gryba 2011; Hanna 1982; Ives 1993; Linnamae and Johnson 1999; Robertson and Blyth 2009; Saxberg and Robertson 2011; Fenton and Ives 1990; Tsang 1998), and will be the term used in this thesis.

Beaver River Sandstone is characteristically variable (Gryba 2011:4; Saxberg and Robertson 2011:3) ranging from macro-crystalline, to micro-crystalline and cryptocrystalline textures (Robertson and Blyth 2009:1). While macro-crystalline samples have been found in many different locals near Fort MacKay, Alberta (Tsang 1998), the only primary source of cryptocrystalline material that has been discovered to date is at the Quarry of the Ancestors east of the Athabasca River Valley near Fort MacKay, Alberta (Figure 2.1a; Saxberg 2007:13). The cryptocrystalline samples exhibit a fine texture that is similar to that of chert, making it a high-quality toolstone (Gryba 2001:iii), while other more coarse-textured samples are lower quality grading to unworkable material (Tsang 1998:17). Secondary sources of this material in the form of cobbles and boulders have been found in the gravels along the Athabasca River Valley from Fort McMurray to Bitumount (Figure 2.1; Gryba 2011:11) as well as in the gravels in the Fort Hills area (Gryba 2011:11; Saxberg and Robertson 2011:8). Much variation was seen in the colour of Beaver River Sandstone artifacts by Fenton and Ives in their 1982 research, with the colour ranging from dusky red (10R 3/4) to yellow (10YR 6-7/3-8) (1982:174). Material collected from the Clearwater River Valley during my research also saw a similar range of variation; however, this variation was in a slightly different spectrum, being from pale red (2.5YR 6/2) to light gray (5Y 7/1) (see Appendix 3). Brownish coloration in this lithic material may indicate ferric oxides in the sample, while darker shades may indicate higher amounts of bitumen in the sample (Abercrombie and Feng 1997:260; Tsang 1998:17). Beaver River Sandstone appears to be visually distinguishable from other similar materials by the presence of specular quartz grains, usually less than 1 mm diameter (De Paoli 2007:1; Gryba 2001:iii). Fossil inclusions are also evident in many specimens (Fenton and Ives 1982:173; Syncrude 1974:47)

Silica is the major constituent of Beaver River Sandstone (Fenton and Ives 1982:172; Robertson and Blyth 2009:1), comprising up to 99% of the lithic material (De Paoli 2007:1; Syncrude 1974:47; Tsang 1998:33-34, 37-38). Poorly sorted angular to well-rounded quartz grains make up the framework of this material (Tsang 1998:17). Sedimentary bands are visible on some specimens, but this is uncommon (Fenton and Ives 1982:173; Gryba 2011:6). Detrital

framework grains compose 65% to 75% of the composition of macro-crystalline and micro-crystalline varieties of Beaver River Sandstone, while the remaining composition is matrix cement made from microcrystalline quartz (Tsang 1998:34). About 85% to 95% of cryptocrystalline Beaver River Sandstone is comprised of the matrix cement (Fenton and Ives 1982:172). This cement forms a very strong bond with the framework grains, and when struck, Beaver River Sandstone usually fractures through the framework grains (Tsang 1998:37). Trace minerals and metals within Beaver River Sandstone may include feldspar and anatase, Cr, Fe, Au, Cu, Pb, Ti and Ca (Robertson and Blyth 2009:1; Tsang 1998:33-34). Tsang interprets this rock as micro-crystalline quartz cemented quartz sandstone (1998:17), while De Paoli interprets it as microquartz cemented orthoquartzitic siltstone (2007:2). The characterization qualities of orthoquartzites are very similar to those of quartzites and cherts; however, unlike other quartzites, the term orthoquartzite signifies that this material did not undergo metamorphic processes during its formation (Kooyman 2000:36). These different interpretations represent differing degrees of silicification that Beaver River Sandstone has undergone. De Paoli's specimens were from the Quarry of the Ancestors, and are characteristic of cryptocrystalline textured Beaver River Sandstone that has undergone diagenetic processes that have resulted in those specimens having a higher degree of silicification. However, Tsang's specimens were not as silicified, leading those specimens to be interpreted as sandstone. Because De Paoli's samples best represent artifacts that are made from this material, his characterization of this material as a microquartz cemented orthoquartzitic siltstone is best suited for this material in archaeological contexts.

2.8.1.1 Geological location of naturally occurring Beaver River Sandstone

In general, the McMurray Formation is characterized by quartz-based conglomerates, sands, silts, shales, oil sands, and Beaver River Sandstone (Figure 2.6; Saxberg and Reeves 2003:293). The upper member consists of horizontally bedded quartz sand, fine grained silts, shales and clays (Tsang 1998:14). The middle member is much the same as the upper member, except that it integrates organic material (Tsang 1998:14). The lower member consists of poorly sorted, lenticular-bedded sandstone and conglomerates, as well as finer grained shale and silt. It is also where naturally occurring Beaver River Sandstone can be found (Abercrombie and Feng 1997:255; De Paoli 2007:1; Fenton and Ives 1990:125; Saxberg 2007:13; Tsang 1998:14). The

thickness of the McMurray Formation varies from 3 m to 23 m in our research area (Patterson et al. 1978:11).

As mentioned previously, Beaver River Sandstone occurs in the Lower McMurray Formation in the Fort MacKay region of northeastern Alberta (Figure 2.1a; Abercrombie and Feng 1997:255; De Paoli 2006:175; Fenton and Ives 1984:128; Tsang 1998:19); however, outcrops of this formation have also been found along the Clearwater River between Contact Rapids and the Saskatchewan/Alberta border (Patterson et al. 1978:11). It has, therefore, been suggested by previous researchers that this valley may have been a source of Beaver River Sandstone in the past (Fenton and Ives 1990:132). In fact, the prediction of in situ Beaver River Sandstone along the Clearwater River Valley in Saskatchewan was the original hypothesis of this thesis project. The original research was not possible because of logistical difficulties; however, the data that was obtained during this research suggests that an alternative source of Beaver River Sandstone along the Clearwater River is less likely. This is discussed in more detail in subsection 7.4.3. Even though the research question for this project has changed somewhat, Beaver River Sandstone remains an important aspect of this study.

2.8.2 Quartz

Quartz was the most common archaeological lithic material found during this project. Next to feldspar, quartz is the most common mineral in the world (Banks 1990:154). It has a vitreous luster, and lacks or has poor cleavage planes (Banks 1990:154; Gilluly et al. 1959:492; Kooyman 2000:28). It is almost entirely comprised of silicon-oxygen tetrahedra joined in a three dimensional network (Banks 1990:154). It often forms hexagonal crystals (Banks 1990:154). In this form it is called crystalline or massive quartz (Kooyman 2000:28). It can also form layers, which is called vein quartz (Kooyman 2000:28). It ranges from colourless and transparent to a variety of colours which include white, yellow, brown, purple, red, green, blue or black, depending on which impurities are within (Banks 1990:154; Kooyman 2000:28). It does fracture conchoidally (Gilluly et al. 1959:492), but in general, is considered of poor knapping quality because of its many fracture planes and general knapping unpredictability (de la Torre 2004:439; Johnson 1999:31; Meyer 2010:27; Storck 2004:181). Observations of the variation in debitage from site to site in this project showed angular and highly fractured debitage to very smooth and complete flakes, suggesting that there is much variability in the flakeability of quartz

and that at least some quartz may be considered as being a reasonable quality lithic material. This is discussed further in subsection 7.4.2. Outcrops of vein quartz were both common and ubiquitous in our survey area as it is throughout the Canadian Shield in northern Saskatchewan, Manitoba and Ontario (ten Bruggencate and Fayek 2010).

2.8.3 Quartzite

Quartzite is comprised of interlocking quartz grains (Gilluly et al. 1959:507) fused with silica cement (Banks 1990:155; Church 1994:12; MacFall 1980:72). This material is formed through a process whereby sandstone has been metamorphosed and recrystallized (Andrefsky 2005:47; Church 1994:11-12; Gilluly et al. 1959:507), and is most easily identified by its sugary to sparkling luster (Johnson 1986:62; Kooyman 2000:36), with individual grains often visible with a microscope or a hand lens (Kooyman 2000:36). Quartzite fractures conchoidally (Johnson 1998:30) and breaks through as opposed to around the grain (Gilluly et al. 1959:507; Kooyman 2000:36). Its color is variable, including white, beige, pink, red, brown (Gilluly et al. 1959:507), tan, and mauve (Johnson 1998:30). It is not considered a high-quality lithic material (Johnson 1998:28, 30). True quartzite is metamorphic in origin, but can be difficult to distinguish from orthoquartzites (Gilluly et al. 1959:507). The best way to distinguish the difference is through context, i.e. true quartzite will be associated with other metamorphic rock (Gilluly et al. 1959:507). This being said, quartzite that has been culturally modified is also likely to have been taken away from its natural context, making it quite difficult to be certain of its origin.

Athabasca Quartzite is found in glacial tills throughout Saskatchewan, and given our study area's proximity to its bedrock source in the Canadian Shield (Johnson 1998:62); it is likely that the quartzite found during our survey was of this rock type. Raw quartzite is found south of the Clearwater River at Buffalo Narrows (Figure 2.1a) in the local glacial tills (Millar 1997:121) and is likely also found in the tills close to the Clearwater River. Alternatively, quartzite may have been procured from its primary source, the Precambrian Shield, which the river has cut down to and exposed in parts of our survey area. There is also access to the Precambrian Shield at the Clearwater River's headwaters near Broach Lake (Figure 2.1a), as well as from areas in relatively close proximity northeast of our survey area.

2.8.4 Chert

Chert is an opaque lithic material that may be somewhat translucent on its thin edges (Kooyman 2000:28). Its appearance may be dull to waxy (Banks 1990:150; Kooyman 2000:28). Chert is a sedimentary lithic material (Luedtke 1992:5) that is comprised mostly of cryptocrystalline silica (Banks 1990:150; Kooyman 2000:28), as well as micro-crystalline or cryptocrystalline quartz and unstructured silica to a lesser extent (Banks 1990:150). As a raw material, it is generally found in the form of nodules or in isolated concretionary areas in limestone, dolomite (Banks 1990:150) or slate (Church 1994:13). Cherts fracture conchoidally and are easily manufactured into stone tools (Luedtke 1992:73-74). At least some of the chert artifacts found in this area are from a non-local source. An example of this is the Hanna projectile point found at the Transport Depot site (HdOk-1) by Steer (1977:188-189, 406-407;), which is made from Knife River Flint, a translucent chert originating from a primary source in western North Dakota (Luedtke 1992:5,124), or originating from secondary sources found in gravels in southern Alberta or Saskatchewan (Kooyman 2000:39). Other chert artifacts found during this research are most likely from a local source. This will be further discussed in subsection 7.4.4.

2.8.5 Mudstone

Mudstone, also known as silicified siltstone, is a metamorphic rock (Kooyman 2000:36). Depending on its silica content, it can be a very flakeable material (Kooyman 2000:36). The source for this material is unknown in this region. Only 2 flakes made from this material were found during our survey; of interest, however, is that one of these found at HfOh-1, may be a blade-like flake.

2.9 Late Pleistocene and Holocene Paleoenvironment

The most important factor shaping landforms in Saskatchewan, with the exception of the Cypress Hills in southwestern Saskatchewan, was the Wisconsin glaciations (Storer 1989:79). Unfortunately, understanding the advances, retreats, and readvances of glaciers is difficult because some of this glacial history may have been erased by later glacial movements and because of a lack of absolute dates of glacial landforms (Dyke 2004:376). Glaciation can be responsible for the movement of massive amounts of rock and sediment over large distances

(Press and Siever 2000:329-330). Because of this, a basic knowledge of the direction of advance and retreat of glaciations here may help us to understand where some of these important lithic resources available in local glacial tills may have originated. In general, glacial movement in the areas north, northeast and east of our survey area was in a northeast to southwest direction, bringing with it quartzite, quartz, and chert; however, glacial movement was transverse from this in a northwest to southeast direction to the south (Figure 2.7; Richards and Fung 1969:50-51). This exemplifies the complexity of glacial movements in our area. Depending on how far the northwest flow travelled, it is possible that Beaver River Sandstone may have been transported from the Quarry of the Ancestors area in northeastern Alberta. A secondary source of BRS in glacial till south of the Clearwater River may partially explain the higher than expected quantities of this toolstone in the Buffalo Narrows and Dillon areas. Northeastern Saskatchewan was not entirely deglaciated until shortly after 8,000 BP (Dyke 2004:399, 400); however, southern portions of the Clearwater River area in northwestern Saskatchewan would have been deglaciated by 10,000 BP or earlier, based on the approximate dating of the Cree Lake Moraine (Figure 2.8; Dyke 2004:413).

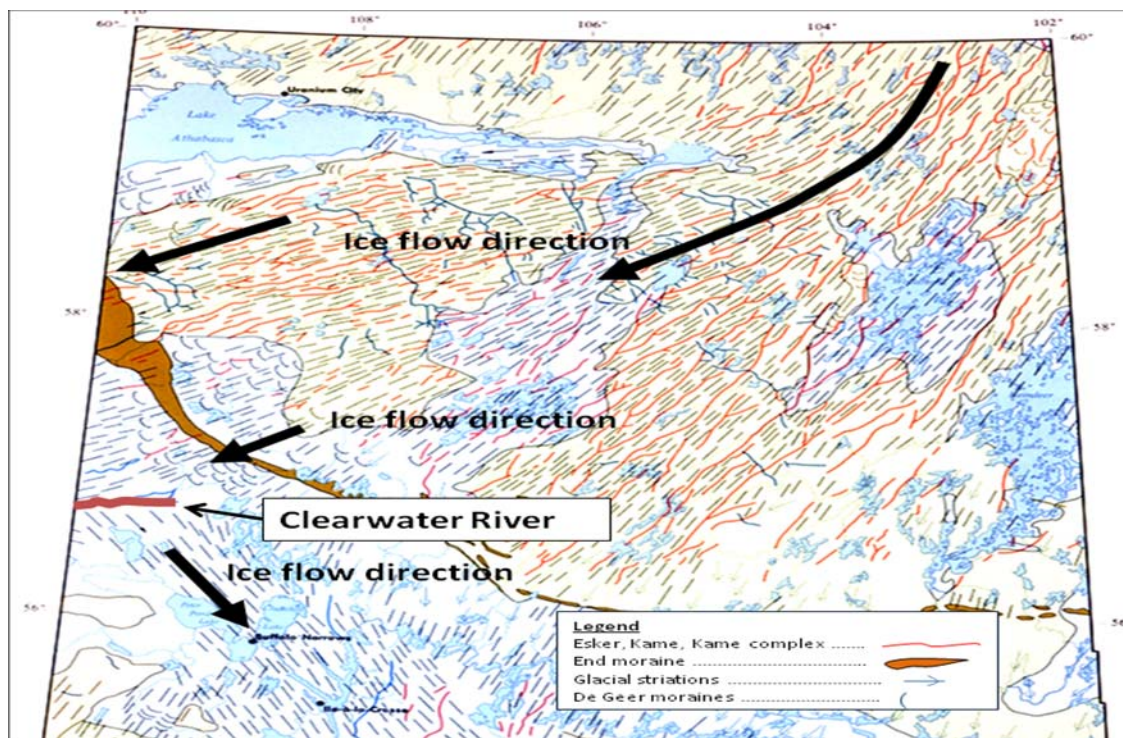


Figure 2.7. Glacial flow directions in northern Saskatchewan (adapted from Richards and Fung 1969:50-51).

2.9.1 Glacial Lake Agassiz

Another significant factor regarding the early paleoenvironmental period of northwestern Saskatchewan would have been the Laurentide deglaciation and the positioning of Glacial Lake Agassiz (Figure 2.5, Figure 2.8). The melting and retreat of the Laurentide Glacier resulted in the creation of Glacial Lake Agassiz along the southwestern flanks of that glacier. Although there are competing interpretations of the history of Glacial Lake Agassiz, I feel that it is most likely that there were at least two overflows from the northwestern side of Glacial Lake Agassiz, creating the Clearwater River spill way by 9,900 BP.

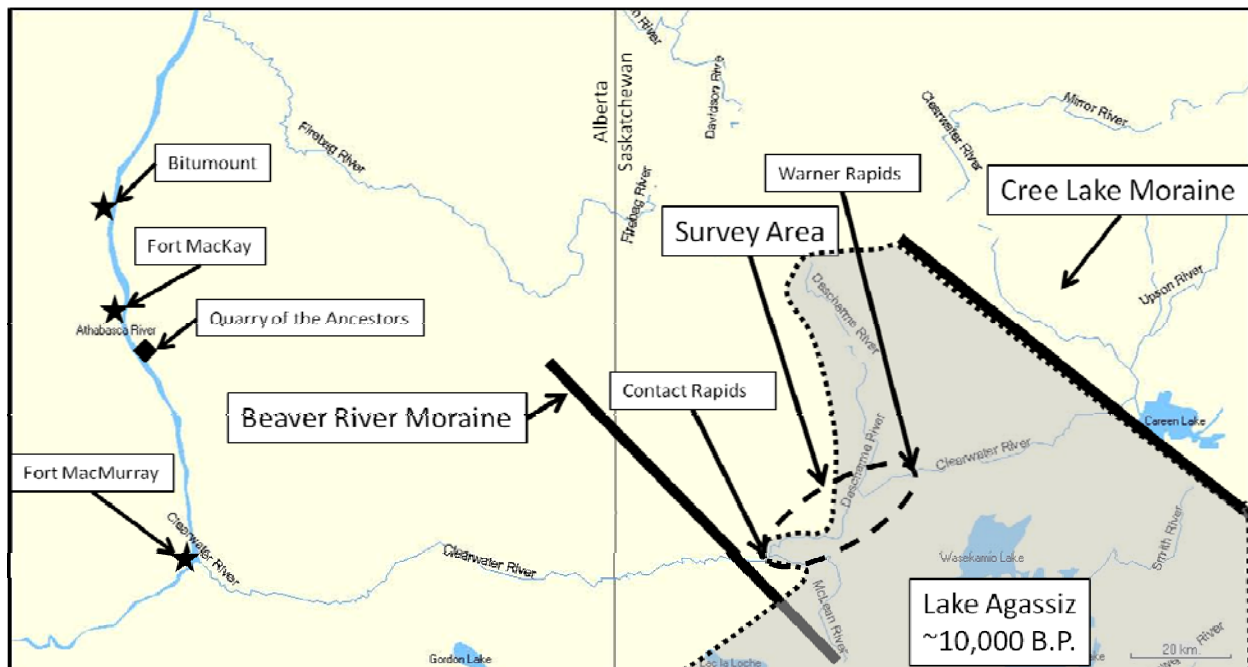


Figure 2.8. Lake Agassiz ~10,000 BP (Adapted from Fisher and Smith 1994:851; after Garmin International Inc.).

Glacial Lake Agassiz was the largest North American proglacial lake during the last glacial retreat (Mann et al. 1999:71; Perkins 2002:283; Teller and Leverington 2004:729), covering more than 150,000 km² of Manitoba, Saskatchewan and Ontario for most of its 4000-year existence between circa 11,500 BP and 7,700 BP (Figures 2.5; Buchner and Pettipas 1990:51; Leverington et al. 2000:174; Leverington et al. 2002:244; Teller et al. 2002:880). The history of Glacial Lake Agassiz is complex, with many hypotheses surrounding issues such as the area that it inundated, the location of outflows, and the timing of these events. The

positioning of Glacial Lake Agassiz was determined by location of the remaining ice sheet and isostatically induced topography changes, and it was common for the lake to rapidly build up in volume and then discharge catastrophically (Teller and Leverington 2004:729). Catastrophic outflows occurred at least 18 times during its history (Teller and Leverington 2004:729).

There were three major phases of Glacial Lake Agassiz. The Lockhart phase occurred between roughly 11,500 B.P and 11,000 BP (Buchner and Pettipas 1990:51). It is associated with the Herman, Norcross, Tintah, and Early Campbell strand lines (Buchner and Pettipas 1990:51). The Moorhead phase occurred between roughly 11,000 BP and 10,000 BP, and the Emerson phase occurred between roughly 10,000 BP and 7,700 BP (Buchner and Pettipas 1990:51). The final discharge of Lake Agassiz was at about 7,700 BP through the Hudson Bay to the North Atlantic (Leverington et al. 2002:244).

Glacial Lake Agassiz was important for many reasons. It has been suggested that climate change occurred as a result of the sheer volume of glacial freshwater released into the oceans during catastrophic releases (Fisher 2007:31; Murton et al. 2010; Teller and Leverington 2004; Teller et al. 2002). It has also been suggested that one of these catastrophic releases created the Clearwater River Valley, laying the basis of middle and late Holocene geomorphology, including access to lithic resources (Dyke 2004:413; Fisher 2007:43; Fisher and Smith 1994:845; Fisher and Souch 1998:72; Johnson and Noel 1995:102; Rayburn and Teller 2007:23; Smith and Fisher 1993:12; Teller and Leverington 2004:729). The earliest occupation of the Clearwater River Valley and area would have been dependent on the creation of the valley by the overflow of Glacial Lake Agassiz, as well as the changing boundaries of the lake. During the Paleoindian period in the Clearwater River Valley and northern Saskatchewan, Glacial Lake Agassiz would have been the most significant feature in the landscape; therefore it is important to know when and where the lake would have allowed for habitation.

Proponents of the northwest overflow route via the Clearwater River Valley suggest that isostatic pressures caused by the Keewatin ice centre depressed the elevation of the Clearwater River area below that of any other overflow option and that this northwest route was indeed deglaciated by about 9,900 BP (Rayburn and Teller 2007), allowing an overflow event from the northwest corner of Glacial Lake Agassiz at this time (Figure 2.5; Rayburn and Teller 2007:28). The previously proposed eastern route and southern overflow routes (Figure 2.5; Fenton et al. 1983:71-72; Leverington, Mann, and Teller 2000:174; Schreiner 1983:94; Teller and Thorleifson

1983:261) have more recent dates, and lack the flood morphology to be a viable explanation for the overflow and drainage of Glacial Lake Agassiz during this time (Teller et al. 2005:1898; Rayburn and Teller 2007). Furthermore, a pollen and diatom analysis (Bjorck and Keister 1983) for the proposed eastern floodway near Thunder Bay also suggests that this route was not viable during the 9,900 BP overflow event. The northwest outlet at the Clearwater River Valley has ^{14}C dates and flood morphology consistent with catastrophic flooding from Glacial Lake Agassiz during the very late Pleistocene or very early Holocene (Smith and Fisher 1993).

The date of 9,900 BP for this event has been determined by radiocarbon dates in the Athabasca delta (Fisher and Smith 1994:845). Rayburn and Teller suggest that the duration of this westerly flow of water from Lake Agassiz to the Arctic Ocean was approximately 500 years from 9,900 yrs B.P to 9,400 yrs BP (2007:28). Smith and Fisher, based on the size of the Clearwater River Valley, claim that this discharge from Glacial Lake Agassiz was much more catastrophic and short-lived and suggest that its duration was only 78 days (Smith and Fisher 1993:12).

Overflow from Glacial Lake Agassiz at approximately 10,900 yrs BP is also likely. The earliest hypotheses postulated that this overflow may have gone through the Mississippi drainage to the Gulf of Mexico (Fenton et al. 1983:49; Leverington, Mann, and Teller 2000:174), or into the Great Lakes through the Thunder Bay area (Teller and Thorleifson 1983:261). A more recent study by Teller et al. (2005) suggests that these previous interpretations for the early outflow of Glacial Lake Agassiz should be re-analyzed and proposes that the northwest outlet should be considered. Their early northwest overflow hypothesis is supported by two ^{14}C dates of 10,600 and 11,100 yrs BP in the Athabasca River delta. Although they admit that these dates may be somewhat questionable, their hypothesis is also supported by newer evidence that the Keewatin ice centre was much thicker and heavier than previously estimated, lowering the elevation in the Clearwater area below the level of the southern Mississippian outlet elevation (Teller et al. 2005:1900-1901). There is also data suggesting that the eastern route was not yet deglaciated (Teller et al. 2005:1900-1901); furthermore, evidence from the Mackenzie River Delta in the Beaufort Sea suggests a two-stage flood event from Glacial Lake Agassiz at about 10,900 BP (Murton et al. 2010).

Estimates for the duration of the flood event at 10,900 yrs BP are quite variable, and range from months up to a century (Teller et al. 2005:1892). Teller et al. (2005) suggest that

after the first overflow through the Clearwater area at 10,900 yrs BP, flow from Lake Agassiz was later redirected to the southern Mississippi route because of a re-advance of the Laurentide glacier (2005:1892). The Clearwater valley route was then re-opened at 9,900 yrs BP (Teller et al. 2005:1892).

Geoarchaeological studies at the Muskeg Valley Quarry site also contribute to the discussion of the overflow events of Glacial Lake Agassiz. Saxberg sees two very distinct fluvial depositional environments occurring at HhOv-319 at the Quarry of the Ancestors (Saxberg 2007:106). The lower level contains boulders at the bottom with a fining upward sequence capping the boulders (Saxberg 2007:105-106), a sequence that indicates a catastrophic flood event (Waters 1992:132-133). A depositional event at a higher level contains pinkish clay and lacks larger clasts, so is indicative of a later, lower energy flood event (Saxberg 2007:106). The reddish hue signals the overflow of a specific lake east of Glacial Lake Agassiz, Lake Kaministiquia, into Glacial Lake Agassiz (Teller et al. 2005:1898). This overflow has been dated to between 9,000 and 10,000 BP (Teller et al. 2005:1898). This suggests that the second, low energy flood that Saxberg sees in her excavation at the Muskeg Valley Quarry site was the 9,900 BP overflow from Lake Agassiz and that the initial overflow at 10,900 BP was catastrophic.

The location of my study area is also the approximate location of the northwest extent of Glacial Lake Agassiz; therefore, studies of the northwestern extent are of extreme interest to my research. After sifting through the literature, there seem to be only a few different possible scenarios for the exact location of this extent. Most of the literature follows Teller et al.'s (1983) interpretation of Lake Agassiz limits with only few modifications. In general, the northeastern-most tip of Lake Agassiz starts just south of Lac La Ronge to the south, and the Churchill River system to the north, and narrows to a point about 30 km east of Churchill Lake (Figure 2.5; Leverington et al. 2002:245; Mann et al. 1999:77; Schreiner 1983:79; Teller and Thorleifson 1983:264; Teller et al. 1983). Most modifications to this map show a more convex "belly" from south of Lac La Ronge to just east of Churchill Lake (Figure 2.5; Boyd 2007:314; Teller and Leverington 2004:733; Teller et al. 2005:1891). Smith and Fisher (1993; Fisher and Smith 1994) suggest a more radical northwestern extent. Smith and Fisher first extended the maximum northwest extent to Wasekamio Lake, which is near the head of the Clearwater spillway (Smith and Fisher 1993:9). In a later publication the following year they extended it even further to

include areas north of the Clearwater River Valley, and almost as far west as the Alberta border west of Lac La Loche (Figure 2.8; Fisher and Smith 1994:845). A smaller glacial spillway southwest of Lac La Loche further supports the extreme western extent of this glacial lake (Widger et al. 2006:11). These diverse views acknowledge the complexities inherent in the study of Glacial Lake Agassiz. Unfortunately, the exact extent of inundation in the Clearwater River area by Glacial Lake Agassiz is not perfectly clear during the time of its maximum extent. Even with the extreme northwest extent that Smith and Fisher (1993) suggest, there is still an area on both sides of the river west of Contact Rapids (Figure 2.8) that was not inundated by Glacial Lake Agassiz (Fisher 2007:32).

2.9.2 Paleoclimate and vegetation

Pollen studies at Cycloid Lake (Figure 2.1a; Ritchie 1985:340) and Eaglesnest Lake (Figure 2.1a; Vance 1986) were chosen to use as proxies to determine postglacial paleoclimate and vegetation at the Clearwater River Valley because of their close proximity to the Clearwater River Valley and the completeness of their paleoenvironmental information. Cycloid Lake, Eaglesnest Lake and the Clearwater River Valley would have experienced deglaciation and similar postglacial conditions at about the same time. Of these two studies chosen as proxies, the interpretation of Eaglesnest Lake will be weighted most heavily in importance because it is closest to the Clearwater River Valley. Other nearby boreal pollen studies at Lake A (Figure 2.1a; Ritchie 1976:1804), Moore Lake (Figure 2.1a; Hickman and Schweger 1996), Lofty Lake, and Alpen Siding Lake (Figure 2.1a; Ritchie 1985:337) will also be used to help determine broader postglaciation vegetation trends.

Cycloid Lake and Eaglesnest Lake, unfortunately, show quite different vegetation histories after deglaciation. At Cycloid Lake From the earliest evidence of vegetation, zone V, shows an open spruce forest environment (Ritchie 1976:1804; 1985:340). There is no evidence of a treeless stage immediately following glaciation (Ritchie 1976:1808). Ritchie suggests that the immediacy of spruce indicates that spruce most likely grew on top of stagnant ice (Ritchie 1976:1808). Other nearby sites, Lofty Lake, Alpen Siding (MacDonald and Ritchie 1986:255; Ritchie 1976:1799, 1804) and others (Strong and Hills 2005:1052) also lack a postglacial treeless stage. Unfortunately, a basal date was not reported for zone V at Cycloid Lake.

Spruce becomes even more dominant in zone IV, which dates to about 8,500 BP (Ritchie 1976:1804). Zone III, dated to approximately 8,500 to 6,400 BP, shows a dominance of birch and alder (Ritchie 1976:1804; 1985:340). Zone II, dating from about 6,400 to 4,400 BP, is dominated by pine associated with birch and alder (Ritchie 1976:1804; 1985:340). Zone I, 4,400 BP to present, shows that pine becomes more dominant, and is in association with birch, alder and spruce (Ritchie 1976:1804; 1985:340). Relative vegetation stability resembling current conditions was established in this area for the last 4,400 years.

The basal date on the earliest zone (III) at Eaglesnest Lake spans 11,800 to 11,000 B.P. and shows that the immediate post-glacial vegetation was tundra grassland (Vance 1986:12, 17). Shrubs, herbs and grasses dominated the pollen spectra (Vance 1986:12). Poplar was found in sheltered areas, and willow and wetland grasses were found in poorly drained areas (Vance 1986:11). This pollen spectrum is interpreted as being the result of a relatively warm, dry and windy climate (Vance 1986:17-18). Alternatively, this pollen spectrum could indicate soils showing a shortage of moisture because of permafrost (Vance 1986:18) and a cold and windy environment. Geoarchaeological investigations at HhOv-319 at the Quarry of the Ancestors also support the paleoenvironmental interpretation of a cold windy environment during this time (Saxberg 2007:106).

The next zone (II), dated 11,000 to 7,500 BP, shows the northward migration and domination of pine and birch (Vance 1986:12, 18). The final zone (I), 7,500 BP to present, shows an increase in pine domination (Vance 1986:18). An increase in charcoal sedimentation in lake cores at this time suggests that increased fires helped to establish pine populations (Vance 1986:18). Vegetation in this area has remained relatively stable for the last 7,500 years (Vance 1986:19).

These conflicting data and their implications for the Clearwater River Valley can be somewhat clarified by Johnson's (1989) study on the present environmental conditions in the Clearwater River Valley. His study found that there were relict grassland clusters characteristic of tundra steppe situated along the valley walls (Johnson 1989:91-99). Johnson suggests that the tundra steppe vegetation was established immediately following deglaciation, at approximately 11,500 BP (Johnson 1989:11-13, 89). Other nearby palynological data at Moore Lake (Hickman and Schweger 1996:166) also suggests that a period of tundra steppe grassland occurred immediately after deglaciation.

During the Hypsithermal period, approximately 7,500 to 6,000 BP, Johnson hypothesizes that grasslands advanced north and migrated into the Clearwater River Valley (Johnson 1989:11, 88). Evidence of this northward migration of prairie grasslands is also supported by other studies of paleoenvironmental proxies in nearby areas (Hickman and Schweger 1996:166; Ritchie 1989:511; Vance et al. 1995:94). Johnson suggests that the hardness of steppe grassland and because it was previously established in the valley, prairie grasslands did not take over (1989:99). The steppe grassland environment was maintained through the grazing of large herbivores, such as bison, caribou, and elk (Johnson 1989:99). Johnson suggests that fires, high temperatures, especially on the south facing valley wall, and nutrient poor soils also helped to uphold the steppe grassland (1989:99).

A final paleoenvironmental factor of interest is wind, as it may have played a role in the rapid northward expansion of spruce in the north-central interior of North America (McLeod and MacDonald 1997:878). McLeod and MacDonald note that spruce seeds are very aerodynamic and strong Laurentide glacial anticyclonic winds may have enabled them to rapidly migrate northward (McLeod and MacDonald 1997:878).

High winds may also explain the rapid buildup of the Athabasca Delta after deglaciation and the drainage of Lake Agassiz through the Clearwater/Athabasca valleys (Rhrine and Smith 1988). This size of this delta is disproportionate for the relatively short period of its deposition, which Rhine and Smith suggest took place between 10,500 and 8,870 BP (1988:158). (1988:158). Rhrine and Smith suggest that high southeasterly winds during this 1,700-year period blew large amounts of sand into the river system and aided the rapid deposition of the Athabasca delta (Rhrine and Smith 1988).

Sand-wedges and ventifacts also suggest strong post-glacial winds and permafrost in the Clearwater River area in the postglacial period (Fisher 1996). Sand-wedges west of the Beaver River moraine (Figure 2.8), associated with Glacial Meadow Lake, suggest that permafrost affected the area between 10,800 to 10,500 yrs BP (Fisher 1996:406). Strongly formed ventifacts in this area indicate a period of intense winds (Fisher 1996:406). Areas dating to 9,900 BP associated with a later Glacial Lake Agassiz plain also show strongly formed ventifacts indicating strong winds. Unlike the area associated with Glacial Meadow Lake just south of the Clearwater River Valley, these areas do not have sand-wedges (Fisher 1996:406-407). This suggests that by 9,900 BP, the area was not affected by permafrost and the temperatures were

warmer than the previous period (Fisher 1996:406-407). The orientation of ventifact shapes and sand dune morphology indicate predominantly southeasterly winds during the early period and primarily southwesterly winds during the later period (Fisher 1996:379-403). Sand dune studies in the Prince Albert/Fort a la Corne region further support intense postglacial winds, but do not support the early southeasterly wind direction (Wolfe et al. 2006:27).

The differing paleoenvironmental data obtained from Cycloid Lake and Eaglesnest Lake highlight the environmental variability during this postglacial period. Johnson's geographical study in the Clearwater River Valley finding relict grasses characteristic of the tundra steppe suggests that, similar to the paleoenvironmental history of Eaglesnest Lake, the environment immediately after deglaciation, 12,000 to 11,000 BP, was most likely characterized by permafrost and a cold, dry and windy climate. Zone III, 8,500 to 6,400 BP, at Cycloid Lake suggests a warm and dry period, which is indicative of the Hypsithermal. This warm and dry period would be consistent with a northward advance of the Plains and parkland/mixed forest region that would have brought grasses characteristic to this type of forest, as was shown in Johnson's (1989) study for the Clearwater River Valley. The following period after 6,400 BP would have likely seen a drop in temperatures and a shift in environmental conditions to the present state.

2.9.3 Paleofaunal

Available evidence suggests that the Clearwater River Valley and area may have been colonized by fauna as early as 10,900 to 9,900 BP. Species that may have been present during the late Pleistocene are the woolly mammoth, horse, camel, bison, shrub-ox, lion, lemming, and ground squirrel (MacDonald and McLeod 1996:87), wapiti, caribou, and musk oxen (Meyer and Russell 2007:102). These species are all suited to the open grassland environments (MacDonald and McLeod 1996:87) that likely occurred during the immediate postglacial period in the Clearwater River Valley and area. Terminal Pleistocene paleontological evidence has been found at slightly more southern latitudes in Alberta for bison, mammoth, and horse (Burns 1996:108). Evidence of postglacial bison has been found east of Edmonton, and dated to 11,620 BP (Burns 1996:108). Mammoth bone has been dated to as recent as 10,200 BP at James River Bridge in west central Alberta (Burns 1996:108).

More than 100 lithic artifacts from sites in the Oilsands region near Fort MacKay were analyzed for blood residue (Parr 2007:678). At least one of these sites is considered to be late Pleistocene based on blood residue analysis that yielded positive results for mammoth (Saxberg 2007:109,118). Other species identified by these analyses were bovine (possibilities include bison and musk ox), cat (possibilities include bobcat, lynx, and mountain lion), chicken (possibilities include quail, turkey, grouse), dog (possibilities include coyote, dog or wolf), guinea-pig (possibilities include beaver, porcupine, and squirrel), rabbit (possibilities include rabbit, hare, and pika), rat (all rat and mouse species), sheep (possibilities include bighorn and other sheep), and bear (possibilities include black and grizzly) (Parr 2007:675,678). This study suggests that late Pleistocene megafauna, as well as a broad range of smaller mammals, were in the Clearwater/Athabasca River area, and that humans likely used them as a food resource.

Postglacial establishment of fish populations is discussed by Rempel and Smith (1998), who found that an area of the Clearwater River held an isolated fish population that consisted predominantly (96%) of fish species originating from the Mississippi River (1998:896). This can most easily be explained by the 9,900 BP overflow of Glacial Lake Agassiz into the Clearwater Valley (Fisher and Souch 1998:62; Rempel and Smith 1998:893). Rempel and Smith suggest that up to 28 fish species that originated from the Mississippi use the Clearwater River (Rempel and Smith 1998:896). Sediment cores from Lake Manitoba also suggest that fish inhabited Glacial Lake Agassiz by 11,000 B.P (Risberg et al. 1999:1309-1311). This evidence suggests that fish would be available to Paleoindian populations along the Clearwater River by at least 9,900 BP.

2.10 Conclusion

The Clearwater River Valley was an important travel corridor during the Historic period and was most likely an important travel corridor during the precontact period as well. The Mackenzie River System would have allowed access to the resources of the Barrenlands up to the Beaufort Sea, and access to the southwest up to the Rocky Mountains via the Athabasca River System. Environmentally, the Clearwater River Valley hosts a large diversity of plants and animals, which in the past likely included caribou, and possibly Plains bison. Herds from both of these species may have used the shelter of this river valley as a part of their wintering range, especially during periods of adverse weather conditions. These highly migratory species may have attracted herd followers from both the more northern Barrenlands and from the more

southern Plains, or alternatively, attracted more sedentary people for seasonal hunting. Evidence suggests that Pleistocene faunal resources that were adapted to open steppe environments such as mammoth, muskoxen, and bison could have inhabited the Clearwater River Valley as early as 10,900 yrs BP, and for certain by about 10,000 BP. Evidence also shows that fish would have been available in the Clearwater and Athabasca Rivers by at least 9,900 BP. Following resources such as megafauna, bison and caribou, it is likely that the Clearwater River Valley was used by precontact populations from the late Pleistocene and early Holocene to the Historic period. It is most likely that this area would have been popular during the winter as migratory species such as bison and caribou may have wintered there. Climatically and environmentally it is likely that this area remained stable from about 6,400 BP to modern times.

Although this valley may have been rich in plant and animal resources, there would have been a scarcity of lithic resources, with the only high-quality resources being limited amounts of chert found in local tills, and Beaver River Sandstone procured from secondary sources in the Athabasca River Valley or directly from the Quarry of the Ancestors near Fort MacKay (Figure 2.1a). Lower quality knapping materials, especially quartz, would have been abundant, but much more difficult to manufacture into formal stone tools. It is likely that there would have been a desire, if not a need, to keep some type of association, either indirectly through trade or direct access, with the Quarry of the Ancestors in order to have decent lithic material available. Alternatively, Beaver River Sandstone may be available in the local tills in and around the Clearwater River Valley.

CHAPTER 3: CULTURAL BACKGROUND SYNTHESIS

3.1 Introduction

This chapter provides an overview of cultural developments in the Clearwater River Valley from its likely first use, about 10,000 years ago, to its current status. The first subsection of this chapter will provide some background on the culture historic theoretical perspective. From there, this chapter will review the more important archaeological work that has occurred and has been published for the Clearwater River Valley area, as well as in adjacent areas. Next will be a culture history of the Clearwater River, based mainly on this work. This culture history will begin with the Paleoindian and Middle Precontact periods commencing as early as 9,900 BP. Because this area has received a relatively small amount of archaeological research, there is some question as to which archaeological culture, Northwest Microblade tradition (NWMt) or the Pre-Dorset, occupied or influenced our study area during the time span between about 3,500 BP to about 2,700 BP, both of these archaeological cultures will be discussed. Following this will be a discussion of the Late Precontact period beginning at about 2,700 BP. This will take us to the Ethnographic and Historic periods, where the Dené, as well as Euro-Canadian history, in the area will be presented. The current cultural status of the area will also be covered before the conclusion of the chapter.

Because this culture history takes a top-down methodology in using information presented from adjacent areas, there is a very real possibility that further data collected from this region will challenge it. There is also the possibility that some material culture attributes here are a result of independent invention and do not represent migration or influence from outside cultures.

3.1.1 The culture historic perspective

The concept of culture was of utmost importance to the development of the culture historic paradigm (Trigger 1996:232-235); however, unlike the way in which the concept of culture is used holistically in cultural anthropology to denote all aspects of human behavior and customs, in archaeology it is much more specific and refers only to recurring material traits (Bates 2005:3-9; Childe 1929:v – vi; Hole and Heizer 1969:43). Although there is much effort directed towards making inferences about the people who left these material goods (Hole and Heizer 1969:43), an archaeological culture is equivalent to material culture and not directly to

people or groups of people. It is difficult to infer the presence of ethnic groups using archaeological cultures (Trigger 1996:312). Factors such as the diffusion of ideas and independent invention make it difficult to ascertain whether certain material traits belong to specific groups of people.

The main objective of the culture historic paradigm is the segregation of archaeological cultures into a time and space framework; it basically focuses on answering the what, when and where of archaeology (Bahn 2001:108; Johnson 1999:18). The first culture historic framework built in North America was for the southwestern United States by Alfred V. Kidder (1924) using data from his stratified excavations at Pecos, New Mexico (Fagan 2005:114; Trigger 1985:64). This early usage of the culture historic perspective laid the groundwork for its continued use in North America throughout the twentieth century (Trigger 1985:64). In fact, during the first half of that century the culture historic perspective was the primary archaeological perspective in use (Trigger 1985:64) and continues to be of importance into the twenty-first century, being ingrained in perspectives that are now more currently accepted (Lyman et al. 1997; Trigger 1996:312, 535). This paradigm has been criticized in the past for being unscientific and insufficient for explaining cultural process (Binford 1962:224; 1964; Johnson 1999:25; Taylor 1948:1957), but is now seen as forming the foundation of our present archaeological theory in North America (Lyman et al. 1997). Today the creation of a culture historic framework is considered the first of the three important goals in archaeology followed next by the reconstruction of ancient lifeways and explaining cultural change (Fagan 2007:31-35).

Culture historic frameworks are important in the study of archaeology for more than a few reasons. The archaeological record is a palimpsest of material remains left by many distinct archaeological cultures over thousands of years. Each of these archaeological cultures would have interacted with other cultures and would have faced unlike environmental factors. The behavioral responses from each of these cultures would have resulted in their leaving a distinct archaeological signature. Although these archaeological cultures may have either homologous or evolutionary similarities, it is important to gain a finer grained understanding of each archaeological culture as its own entity. To do this we need to be able to recognize each culture in the archaeological record. Understanding the historical background of an archaeological culture is also useful when trying to fathom ancient lifeways. In understanding culture change, we must be able to place archaeological cultures chronologically within this time-space

framework. Agents of cultural change, such as diffusion, migration and independent invention, can only be understood if detailed cultural chronologies are built. Culture historic frameworks are also important in regions such as the boreal forest where there is a paucity of material that can be dated. Finding culturally diagnostic material can give relative dates to sites that otherwise could not be dated.

Canada has a very large land mass, a relatively small population, a short field season, and many remote areas; because of this, many regions of Canada do not have well developed archaeological cultural chronologies (Kelly and Williamson 1996:9; Trigger 1996:312). It is also likely that Canadian archaeology as a whole has been dominated by the culture historic perspective for these reasons (Kelly and Williamson 1996:9; Trigger 1996:312). The Clearwater River Valley in northwestern Saskatchewan, the research area of this thesis, faces all of these challenges and, as will be discussed in the following section, has previously received very little archaeological attention. Furthermore, a stratified archaeological deposit such as that excavated at Pecos by Kidder at the beginning of the twentieth century is not characteristic of boreal forest archaeology, nor is the availability of datable organic material, making the construction of a culture historical framework all the more challenging. For all of these reasons, the following culture history of this research area depends heavily on the work of other archaeologists in the adjacent areas of the Northern Plains, the Oilsands area of northeastern Alberta, the Barrenlands of the Northwest Territories and Nunavut, as well as the eastern boreal forest of Saskatchewan.

3.2 Previous Research

Two major archaeological projects have previously taken place within the Clearwater River Valley. The first was Steer's (1971, 1977) survey and excavations in 1971 and 1972 that focused on Fur Trade era archaeological resources of the Methye Portage, an important portage joining the Churchill River System to the Mackenzie River System via the north end of Lac La Loche to the Clearwater River (Figure 3.1a and 3.1b). The survey also covered areas of the Clearwater River upriver from Methye Portage (Figure 3.1b). The second was Pollock's more intense survey of the Alberta portion of the Clearwater River in 1976 and 1977 (1978). Further research that is of significant archaeological importance to the Clearwater River, especially for understanding the cultural history of the area, is Millar's (1982, 1983, 1997) work in the Buffalo Narrows area, Saxberg and Reeves (2003), and Reeves et al.'s (2011) work from Alberta's

Oilsands area, Gordon's (1996) work from the Barrenlands, and a corpus of material by Meyer (1979, 1981, 1983a, 1983b, 1995, 2007, 2010), and Meyer et al. (1981) based on data from several areas of northern Saskatchewan (Figure 3.1a and 3.1b).



Figure 3.1a



Figure 3.1b

Figure 3.1a and 3.1b. Map of important archaeological sites from previous research (after Garmin International Inc.; Magne and Fedje 2007:Figures 11.5 and 11.7).

Although the objective of Steer's survey was to assess the historical and the precontact potential of areas including the Saskatchewan portion of the Clearwater River upriver from Methye Portage (Figure 3.1b; Steer 1972:3), his focus was obviously on historic sites. This is evident because the only prehistoric finds discovered were in lower levels of historic sites (Steer 1977:130, 139-140, 188-192). The diagnostic points found in Steer's archaeological investigations do confirm the presence of the precontact archaeological cultures listed in the culture history section of this chapter. Steer's (1977) research confirms the important role that Methye Portage and the Clearwater River played during the Fur Trade era (Figure 3.1a and 3.1b). Beaver River Sandstone, an important lithic material in these assemblages along the Clearwater River, was not identified in his publication, because Beaver River Sandstone, as such, was not formally defined until 1974 (Syncrude 1974), which was after the fieldwork and likely his lab work had been completed.

Pollock's archaeological investigations in the Alberta portion of the Clearwater River Valley in 1976 and 1977 have been the most extensive studies in the area to date. Pollock found that certain terrain features, such as river narrows, sharp bends, landforms that are over eight meters in height, and portages, especially on the up-river side, were good indicators of high site potential (1978:26, 28). These factors were considered while conducting the fieldwork for this thesis. Pollock's research also unveiled culturally diagnostic projectile points which were used to develop the culture history presented later in this chapter.

The lithic analyses of Pollock's archaeological investigations are also of great importance to this study. Although the density of Beaver River Sandstone flakes or tools is not as high as in sites in the Athabasca River valley near Fort MacKay (Figure 3.1b), the higher-than-expected quantity of Beaver River Sandstone found by Pollock along the Clearwater River indicates that this river may have been an important travel route for people who also utilized the Fort MacKay area. The frequent occurrences of Beaver River Sandstone in the Clearwater River Valley could also mean that there was a strong trade affiliation between groups near the source of Beaver River Sandstone on the Athabasca River and groups in our study area in the Clearwater River Valley. The present research, which was conducted further up-river from Pollock's research, suggests a similar trend there.

Millar's work is best summed up in his (1997) *The Prehistory of the Upper Churchill River Basin*. This work was published posthumously in British Archaeological Reports, and is

very similar to his unpublished report dating to 1983. The focus of these two reports (Millar 1983, 1997) is the excavations at two sites, the Martin Chartier site and the Bernadette Chartier site, both of which are located along the Kisis Channel that separates Peter Pond Lake and Churchill Lake (Figure 3.1b). These excavations yielded successive occupational levels from the Middle to Late Taltheilei tradition, Selkirk, and historic Dené archaeological cultures (Millar 1997:93). Millar's 1997 research also documents surface collections gathered in the Buffalo Narrows and La Loche region (Figure 3.1b) by local collectors Martin and Thomas Chartier. Projectile points from these collections that are very similar in form to Fort Creek Fen Complex, Goshen, Lusk, Nezu Complex, and Cody Complex, suggest that occupation in the area began with the Paleoindian period, possibly as early as about 10,000 BP (see Millar 1997:125; Reeves et al. 2011; Saxberg and Reeves 2003:307-310). This is followed by Middle Precontact period occupations represented by projectile points similar to Oxbow, McKean and Pelican Lake (Millar 1997:126), and then Late Precontact period occupations represented by Taltheilei projectile points and Late Woodland period pottery (Millar 1997:92-94). The most common diagnostic projectile points found in these collections were Taltheilei, comprising 148 of the 246 projectile points found in the collection (Millar 1997:127) and suggesting a more active use of this area by these people than had occurred previously by other cultural groups. From the Taltheilei points found in the collection, Millar deduced that ancestral Dené have used the Buffalo Narrows region (Figure 3.1a and 3.1b) from about 2,600 BP to present (1997:128).

Millar's (1997) work has led him to suggest that this area was initially peopled by a group from the Northern Plains region, starting at about 10,000 BP (Millar 1997:99). Millar then believes that the descendants of these people continued to culturally evolve and created their own distinctive but Northern Plains-influenced indigenous culture until approximately 6,000 BP (Millar 1997:99). At about 6,000 BP Millar sees a change that he has interpreted as a movement of people from the north, specifically from the Mackenzie River District (Figure 3.1a), leading to the development of the ethnographic Dené (Millar 1997:99).

Millar uses knowledge of raw material source origins to suggest that certain projectile points are related to different cultures' areas. He suggests that all of the projectile points manufactured from Knife River Flint or brown chalcedony are stylistically related to Northern Plains archaeological cultures, while all but one of the projectile points manufactured from Beaver River Sandstone are stylistically related to northern archaeological cultures (Millar

1997:121). Furthermore, the projectile points manufactured from Beaver River Sandstone were only found in the La Loche area (Figure 3.1a and 3.1b; Millar 1997:121). The excavations conducted by Millar and his documentation of collections from the area laid the background for the most accurate and complete culture history of the area directly south of our Clearwater River study area (Figure 3.1b).

By compiling their own work, as well as the large amounts of grey literature from Alberta's Oilsands area (Figure 3.1b), Saxberg and Reeves (2003) and Reeves et al. (2011) have put together a culture history for the Alberta Oilsands area, which is directly adjacent to the western portion of our study area. Reeves et al. (2011) breaks up the culture chronology into three major divisions: the Paleoindian, the Pre-Taltheilei Middle Precontact period complexes, and the Chartier Complex. The Paleoindian consists of the Fort Creek Fen Complex, the Nezu Complex, and the Creeburn Lake Complex. Saxberg and Reeves suggest that the Fort Creek Fen Complex dates from 9,800 BP to 9,500 BP and is represented by thin lanceolate projectile points that are stylistically similar to lanceolate Alder-type points, Chesrow Complex points and Goshen points from the Plains region (2003:307-309, Figure 9a). Saxberg and Reeves suggest the Nezu Complex dates from 9,400 BP to 8,500 BP and is a variant of the Cody Complex from the Plains region (2003:308-310). Saxberg and Reeves suggest the Creeburn Lake Complex dates from 9,400 BP to 7,750 BP and is similar in form to Agate Basin and Lusk from the Plains region, and Northern Plano from the Barrenlands region to the north (2003:310-311). The Pre-Taltheilei Middle Precontact period complexes include the Early Beaver River Complex and the Firebag Hills Complex. The Early Beaver River Complex is suggested to date from 7,750 to 7,000 BP and is similar in form and possibly related to the Shield Archaic culture from the Barrenlands region to the north or side-notched points similar to Gowen and Mummy Cave to the south from the Northern Plains (Reeves et al. 2011:3, 28; Saxberg and Reeves 2003:311). Reeves et al. (2011:28) further state that the Oxbow points often found in early Beaver River Complex sites suggest connections to Middle Precontact cultures of the Northern Plains. The Firebag Hills Complex is suggested to date from 3,500 BP to 2,600 BP and is believed to be a local expression of the Pre-Dorset branch of the Arctic Small Tool tradition by Reeves et al. (2011:34). The Chartier Complex is the final major archaeological culture in their culture historic scheme. It is suggested to date from 2,650 BP to 300 BP and is believed to be an expression of the Taltheilei tradition and historic Dené in this area (Reeves et al. 2011:40).

Reeves et al. (2011:49) further suggests that the people who produced this archaeological culture wintered in the Buffalo Narrows/Lac la Loche region, and shortly after spring break-up, would go to the Quarry of the Ancestors and Birch Mountains via the Methye Portage and Clearwater River to spend the summer (Figure 3.1b). Before fall freeze-up, Reeves et al. believe these people would return to Buffalo Narrows via the Clearwater River and the Methye Portage (Figure 3.1b; 2011:49).

Reeves et al. (2011) suggest that sites found in the Firebag Hills-Deschaine River headwaters area just north of this project's survey area (Figure 3.1b), represent the Beaver River Complex (38), and the Firebag Hills Complex (40). The Firebag Hills complex has apparently been identified from a triangular unnotched point found during the 2007 field season; however, this interpretation is contested by other researchers who believe the find to be an Eastern Triangular type similar to late-period forms found in the boreal forest of east central Saskatchewan, west central Manitoba and boreal regions of Manitoba, and Black Lake (Meyer 1981b: 23; Somer et al. 2009:364). Reeves et al. (2011) suggest that the Firebag Hills Complex is represented by 10 sites in the Firebag Hills-Deschaine River confluence area, but I am unsure what the basis of this interpretation is. Unfortunately, the original report of the 2007 fieldwork (Reeves et al. 2008) which documents these disputed artifacts, as well as other sites identified as belonging to the Firebag Hills Complex, has not been cleared with the Government of Saskatchewan's Archaeological Resource Management Section (SARMS), so was not available to me at the time of this writing. It is important to note that Reeves et al.'s (2011) identification of the Firebag Hills complex in this region, which they claim is closely affiliated with the Pre-Dorset culture, is somewhat contentious as Meyer (1995; 2010) has excluded the Pre-Dorset from his interpretation of the culture history of the Clearwater River area. Meyer's (1995; 2010) ideas will be discussed later in this section.

Gordon (1996) presents an archaeological culture history of the northern Barrenlands of the Northwest Territories and Nunavut (Figure 3.1a). Much of his thesis is concerned with the dependence of Barrenlands archaeological cultures on migratory herds of barren-ground caribou. Gordon suggests that people have followed caribou in this area for the past 8,000 years beginning with the Northern Plano archaeological culture (Gordon 1996:1, 327). Over the next 4,500 years, the Northern Plano culture developed into the Shield Archaic culture, whose peoples, facing a cooling climate, moved southeast into what is now Manitoba (Gordon

1996:239). During this same time period, the Pre-Dorset culture spread into northern Saskatchewan, as far as Reindeer Lake (Figure 3.1a), and continued to use this area until about 2,700 BP (Gordon 1996:239). Taltheilei was the next culture appearing on the Barrenlands, arriving shortly after 2,700 BP. This culture is further separated into Earliest, Early, Middle, and Late Taltheilei by Gordon (1996). From 300 to 700 years ago, the people responsible for the Late Taltheilei were forced to stay in the forests in the southern portion of their range because of a period of cooling that has been termed the Little Ice Age. Gordon suggests that the peoples of the Taltheilei culture were the last of the caribou herd followers. The descendents of these people became the historic and ethnographic Dené, who were more sedentary than their ancestors. Moving into the newly unoccupied Barrenlands region were the Caribou Inuit. These people were prevented from entering the forests in which the caribou wintered by the historic Dené (Gordon 1996:239).

Meyer is the single most important source of information for the boreal region of northern Saskatchewan, having published extensively on this area. The most applicable work to this thesis is his 1995 publication on the Churchill River System (Figure 2.1a) and his 2010 report on the upper Clearwater River.

Meyer combines his own archaeological research with those of others, drawing heavily from materials collected in the Buffalo Narrows-La Loche area (Figure 3.1b; Meyer 1995:54). Meyer (1995) begins his culture history for the Churchill River with Early Plains cultures dated from 10,200 BP to 9,400 BP. They are represented by stemmed points similar to those from the Alberta Complex and lanceolate points similar to Frederick and Lusk points found at Buffalo Narrows (Figure 3.1b; Meyer 2010:4). Meyer suggests the Middle Plains period dates from 7,500 BP to 2,000 BP and is represented by Early Side-notched points, Oxbow, Hanna and Pelican Lake (2010:4). He suggests that the Taltheilei culture dates from about 2,500 BP to about 500 BP and is attributed to the ethnographic Dené (1995:55-56; 2010:4-5). Meyer suggests that Late Woodland cultures begin to appear in the Buffalo Narrows region (Figure 3.1b) by about 1300 A.D. and are represented by pottery from the Buffalo Lake Complex, and then the Selkirk Complex by about 1200 A.D. (2010:4). Precontact pottery has not yet been found in the Clearwater River area; however, rock-art found along the upper Clearwater River that is consistent with the Selkirk archaeological culture suggests an occupation by these people on the Clearwater River at likely the same time (Meyer 2010:26). As mentioned above, it is

important to note the absence of the Pre-Dorset archaeological culture in Meyer's (2010) research in the Clearwater River area.

The following section will provide a hypothetical culture history of the Clearwater River area. It is important to acknowledge that the archaeological evidence for creating a culture history in our specific area is weak to non-existent. In lieu of sufficient archaeological evidence from within our area, we are forced to examine the archaeological evidence from adjacent areas to achieve our goal. Furthermore, because of the difficulty dating adjacent boreal forest archaeological sites, as well as a relative lack of archaeological evidence in adjacent areas, many of the dates used in the following are conjectural.

3.3 The Paleoindian period in northwestern Saskatchewan

The best example of the Paleoindian period in northwestern Saskatchewan is seen in the Buffalo Narrows region and is represented by projectile points that closely resemble Goshen, Alberta, and Lusk (Meyer and Walker 1999:20; Millar 1997:125). Similar Paleoindian points of the Plains region are also found in the Fort MacKay area of Alberta (Figure 3.1b; Saxberg and Reeves 2003). Western portions of the Clearwater River may have been deglaciated and open for habitation by as early as 10,900 BP and would have certainly been open for habitation or use by 9,900 BP, as discussed in the Glacial Lake Agassiz section of the previous chapter. A "stubby" Clovis point that was excavated in the Cold Lake area of Alberta (Fedirchuk and McCullough 1992), about 200-250 km southwest of our study area, suggests that Paleoindian people may have been in, or close to, the Clearwater River Valley soon after deglaciation. A similar projectile point excavated at Charlie Lake Cave in northeastern British Columbia (Figure 3.1a) has been dated to 10,700 BP (Driver and Vallieres 2008:243).

Paleoindian archaeological sites found on the Northern Plains and the Great Lakes region are frequently associated with megafauna remains (e.g. mammoth and mastodon) or large game, such as bison and caribou (Krause 1998:65; Stork and Spiess 1994). Mammoth or mastodon blood has been detected on a Paleoindian point from the Oilsands area of Alberta (Figure 3.1b; Saxberg 2007:109, 118). During this early period, it is most likely that this area supported tundra-steppe vegetation that would have been attractive to megafauna, such as mammoth, and other large mammals, such as *Bison antiquus*, and caribou (sections 2.8.2, 2.8.3, and 2.9, this thesis; Burns 1996:108; Hickman and Schweger 1996:166; Johnson 1989:99; MacDonald and

McLeod 1996:87; Richie 1989:511; Vance et al. 1995:94). After the megafauna extinctions around 10,000 years ago, later Paleoindian hunters likely began to specialize in the hunting of the available large game remaining, such as bison and/or caribou that may have wintered in the area. Faunal remains found at a site in northeastern Alberta dating to this time-frame (Saxberg and Reeves 2003:308) support the large game hunting nature of these people. This period most likely spanned from about 10,000 BP to about 7,000 BP (Fedirchuk and McCullough 1992:130-134).

The first human occupation along our portion of the Clearwater River Valley would likely have occurred shortly after the northwestern drainage of Lake Agassiz through the Clearwater River Valley about 9,900 years ago (section 2.8.1; Fisher 2007; Fisher and Souch 1998; Fisher and Smith 1994:845; Rayburn and Teller 2007). It is possible that the most westerly portions of our survey area may have been occupied by people represented by the Fort Creek Fen/Goshen archaeological cultures. Comparable points have been found at Buffalo Narrows, which is about 100 km south of the Clearwater River, and in the Fort MacKay area (Figure 3.1b; Saxberg and Reeves 2003:307), which is about 100 km north west of the Saskatchewan portion of the Clearwater River. Goshen dates from about 10,000 to about 10,900 BP in the United States (Fiedel 2002:420; Hofman and Graham 1998:96; Holliday et al. 1999; Sellet 2001:56-59; Sellet et al. 2009:749). Unfortunately, Goshen has not been dated in northwestern Saskatchewan; however, it would be reasonable to suggest that dates here would likely fall in the same range, or possibly slightly later, given the cold, dry and windy postglacial conditions here (section 2.8.2; Fisher 1996:406; Rhine and Smith 1988).

The Fort Creek Fen Complex/Goshen occupation of northwestern Saskatchewan would have been followed by the Cody Complex. This complex is represented in northwestern Saskatchewan by an Alberta point found in the Buffalo Narrows area (Figure 3.1a and 3.1b; Millar 1997). The Cody complex is also represented in the Fort MacKay area (Saxberg and Reeves 2003:309). It is estimated that Alberta points date to between 9,500 to 9,000 BP in more southern areas of Saskatchewan (Meyer and Walker 1999:20). It is likely that the Cody Complex may have been produced in areas of northwestern Saskatchewan during a similar time frame. It should be noted that a possibility of error may exist because of possible misidentification between Paleoindian Fort Creek Fen Complex points/Goshen, or Cody Complex points with Middle Taltheilei points because of a similarity between their forms (see

Gordon 1976:63; 1996:88-90; Harp 1961:53; Irving 1968:38; McGhee 1970:60; Kooyman 2000:110; Reeves et al. 2011:82, 91-92).

The entirety of northern Saskatchewan was deglaciated by about 8,000 years ago (Dyke 2004:399). Environmental studies in adjacent areas suggest that the climate in the Clearwater River Valley during this time was relatively warm and dry (Johnson 1989:11; Yansa 2007:131). Meyer suggests that the boreal forest/Barrenlands transition zone was at least 350 km further north than it is today (1983a:144). Consequently, it is likely that caribou would have wintered in the area north of Lake Athabasca and the northern portion of Saskatchewan's Athabasca Region would have been the very extreme southerly limit for these herds during this time (Meyer 1983a). Meyer argues ancient hunters specialized in barren-ground caribou hunting would have rarely needed to move as far south as the Athabasca Region for this reason, further explaining the sparseness of archaeological evidence found in the Athabasca region relating to northern archaeological cultures during this time period (1983a:146).

Meyer (1983a) and Reeves (1972) both argue for a similar northward expansion of the Northern Plains cultures during this same period (Meyer 1983a:142; 1995:54-55; Reeves 1972:1227). Instead of Northern Plano points from the Barrenlands, Lusk projectile points from the Northern Plains are better represented at Buffalo Narrows, Peter Pond Lake (Figure 3.1a and 3.1b; Meyer and Walker 1999:20), and Besnard Lake (Figure 3.1a; Meyer 1995:55) and likely the Clearwater River. While Northern Plano points represent northern-Barrenlands-adapted people who hunted caribou (Meyer 1983a:146), Lusk points found in the more southern portion of northwestern Saskatchewan likely represent Plains-adapted hunters who would have most likely predominantly depended on bison, but may have also utilized a wide variety of smaller mammals (Meyer 1995:54-55; Peck 2011:118; Wheat et al. 1972:164). Meyer et al. suggest Lusk points date to approximately 8,500 to 7,800 years ago in northwestern Saskatchewan (n.d.:39). That an archaeological culture associated with bison hunting (Wheat et al. 1972:164; Alexander 1963:Table1, Table 2) occupied this area suggests that it is likely that the Northern Plains ecozone must have expanded this far north, or was at least somewhat proximal to this area. Relict parkland grasses in the Clearwater River Valley, further suggest the proximity of the Northern Plains at some time in the past, likely during this period (Johnson 1989).

In general, the Paleoindian period in northwestern Saskatchewan would have been characterized by many environmental changes, as well as changes in mammalian fauna.

Paleoindian people would have been influenced by the largest freshwater lake in the world, periglacial conditions, and most likely a change from tundra-like vegetation cover to coniferous to boreal vegetation to open grasslands within a relatively short time. Paleoindian points made from Beaver River Sandstone, which is sourced from the Fort MacKay area of northeastern Alberta (Figure 3.1b), are found in areas much further south, such as Lac La Biche, Cold Lake (Figure 3.1a; Fenton and Ives 1990:124) and Prelate in southwestern Saskatchewan (Figure 3.1a; Linnae and Johnson 1999:22). This distribution suggests the high mobility or possibly extensive trade networks of Paleoindian groups in this area.

3.4 The Middle Precontact period in northwestern Saskatchewan

The Middle Precontact period is represented in this area by Early Side-notched or Gowen (Meyer 1995:55; Reeves 2011:28, 29), Oxbow, Hanna, and Pelican Lake projectile points (Millar 1997:126) and dates from about 7,500 BP to about 2,000 BP (Meyer 1995). The Middle Precontact period assemblage is much more conspicuous than the earlier Paleoindian assemblage at Buffalo Narrows (Figure 3.1a), suggesting that the Middle Precontact period occupation in this area was much denser (Millar 1997:126) than the previous Paleoindian period. Faunal remains from the Duckett site near Cold Lake (Figure 3.1a) suggest that Middle Precontact period people in this area used a generalized opportunistic hunter-gatherer strategy as opposed to a specialized bison hunting strategy (Fedirchuk and McCullough 1992:139). This suggests that, although influenced by Plains cultures, Middle Precontact people likely developed their own unique adaptations to the boreal forest/parkland ecosystem in northwestern Saskatchewan.

Early Side-notched points are similar to Gowen points in the Mummy Cave series used on the Northern Plains between 7,000 and 5,500 BP (Kooyman 2000:119; Reeves 2011:28, 29, 97; Walker 1992) and have been found at Lac La Loche (Steer 1977:317; Meyer 1995:55), the Near Norbert site and McCallum site (Figure 3.1a; Meyer 1995:55; Meyer et al. 1981:114, 142), and Brabant Lake (Figure 3.1a; Pentney 2002:62-63). A Hanna projectile point and an Oxbow projectile point were excavated at the Transport Depot Site on the Clearwater River (Figure 3.1b; Steer 1977). The Hanna point is made from a brown chalcedony that is most likely from southern Saskatchewan or southern Alberta, but may be Knife River Flint from North Dakota. The Hanna and Oxbow projectile points are similar to ones used on the Northern Plains between 5,000 and 3,000 years ago (Kooyman 2000:121). Points stylistically similar to Oxbow have also

been found at Gregoire Lake (Figure 3.1b; Pollack 1978:126), Buffalo Narrows (Figure 3.1a and Figure 3.1b; Millar 1997:106), Lac La Loche (Hanna 1982:41), and on the north side of Lake Athabasca (Pollack 1978:126). McKean lanceolate points, similar to ones used on the Northern Plains between 5,000 and 3,000 BP, have been found at Buffalo Narrows and McKusker Lake (Kooyman 2000:121; Meyer 1983a:158; 1995:55). Pelican Lake points are also found west of the Clearwater River in the Birch Mountains (Figure 3.1b; Pollack 1978:129), at Buffalo Narrows, as well as Saleski Lake near La Loche (Figure 3.1b; Millar 1997:106), and on the south shore of Lake Athabasca (Wright 1975:179). These projectile points are similar to ones used on the Northern Plains between 3,300 and 1,800 BP (Kooyman 2000:122). Middle Precontact projectile points are well represented throughout northwestern Saskatchewan. In general, except for extreme northerly areas, northwestern Saskatchewan has been dominated by Plains oriented/influenced archaeological cultures up to this point. But a possibility of error may also exist in the identification of Middle Precontact period Early Side-notched/Mummy Cave series points with Talttheilei because of a similarity between their forms (see Gordon 1976:158, 177; 1996:59; Kooyman 2000:119; Meyer et al. 1981:142; Pentney 2002:62-63; Reeves 2011:97; Walker 1992:72-73).

3.4.1 Northwest Microblade tradition and/or Pre-Dorset

The next time period is less understood in the Clearwater River area. The Clearwater River lies between two somewhat contemporaneous archaeological cultures, the Northwest Microblade tradition (NWMt) and the Pre-Dorset, both of which used a similar microblade technology. To the west, the Bezya site signals the southeastern most reaches of the NWMt (Figure 3.1b; LeBlanc and Ives 1986:81, Younie 2008:188). Lake Athabasca to north and Reindeer Lake in the east mark the possible limits of the Pre-Dorset (Gordon 1996:149, 239). The Clearwater River has not been considered as being within the boundaries of either culture prior to this thesis. The following factors suggest that one or both of these archaeological cultures may have ventured into the Clearwater area. A blade-like flake was found at one of the sites discovered during our research (HfOh-1). Second, the quantity of Beaver River Sandstone (BRS) found in our portion of the Clearwater River suggests some type of connection, either technologically, trade or cultural, to groups from the northwest falling within the region associated with NWMt. That Beaver River Sandstone was shared between our survey area and

the Fort MacKay region also suggests that technological characteristics, such as the use of microblades, may have also occurred in the Clearwater River area (Figure 3.1b). Third, at least a few researchers believe that there are Pre-Dorset sites further south in Alberta's Oilsands area, as well as in the Firebag-Deschaine River headwaters area, which is directly north of our survey (Figure 3.1b; Saxberg and Reeves 2003; Reeves et al. 2011). If these researchers are correct in their interpretation that people with a Pre-Dorset culture lived in the Firebag-Deschaine headwaters area, it is also possible that these people may have used the entire Deschaine River to its forks with the Clearwater River (Figure 3.1b). Further support for this model is the blade-like flake found at the confluence of the Deschaine River and Clearwater River during our research. Finally, Gordon (1976, 1996) speculates that the Pre-Dorset were herd followers following migratory barren-ground caribou. As suggested in the previous chapter, if the southernmost limit of barren-ground caribou includes the Clearwater River area, it is also possible that the Clearwater River area fell within the range of the Pre-Dorset archaeological culture.

3.4.1.1 Northwest Microblade tradition

The Northwest Microblade tradition (NWMt) is a loosely defined term used to identify a microblade-using archaeological culture that occurs in Alaska, Yukon, Northwest Territories, and northeastern Alberta (Ackerman 2007:166; Esdale 2008:5; Wright 1995:165; Younie 2008:25). The material manifestations of this culture are Donnelly burins, core-burins, flake-burins, burin spalls, large and small scrapers, bifacial tools, lanceolate, stemmed and notched tools, convex and straight-based projectile points, spoke-shaves, abraders, rejuvenation tablets, large blades and blade-like flakes, and microblades manufactured from a variety of cores including wedge-shaped Campus cores and conchoidal or tongue-shaped cores (Ackerman 2007:166; Clark 2001b:69; Dixon 1999:175; Willey 1966:415; Younie 2008:24). Although NWMt microblades seem to be homogenous (Clark 2001b:70), they appear to be manufactured from different core types depending on the region, and a relationship seems to exist between core type and lithic raw material (Clark 2001b:70, 73; Magne and Fedje 2007:187; Younie 2008:16, 25, 28). With this said, the same researchers who acknowledge the diversity involved in the production of microblades also suggest that the defining feature of the NWMt is the wedge-

shaped *Campus* microblade core (Clark 2001b:69; Magne and Fedje 2007:184, 186; Younie 2008:Abstract).

The NWMt was first defined by MacNeish (1954; Clark 2001a; 2001b; Younie 2008:24-25) to describe a microblade assemblage that he excavated at the Pointed Mountain Site in the Mackenzie District of the Northwest Territories, as well as similar complexes in that region. The Denali Complex was later defined by West (1967) to describe a very similar archaeological complex in Alaska (Clark 2001a; 2001b; Younie 2008:24-25). In general, the terms NWMt and Denali Complex are used to describe similar archaeological cultures in the Yukon and Northwest Territories, and in Alaska respectively (Ackerman 2007; Clark 2001a; 2001b; Dixon 1985; 1999; Willey 1966:415-416; Younie 2008:24-25). Both Younie (2008:24-25) and Clark (2001a; 2001b) suggest that the similarities between these two archaeological cultures outweigh their differences and that both should be represented under a common term. Because MacNeish was the first to define this archaeological culture, his term for it, NWMt, will be used in this thesis to refer to both the Denali and NWMt.

Because of the similarity in microblade production methods between the NWMt tradition in northwestern North America and the Dyuktai culture in Siberia, there is likely a connection between the two archaeological cultures (Younie 2008:13). Microblade use was common in Siberia between 18,000 BP and 20,000 BP (Ackerman 2007:168; Kuzmin 2008), whereas microblade use in the interior of North America may have, debatably, begun as early as 13,000 BP at Bluefish Caves in the Yukon (Ackerman 2007:164; Cinq-Mars 1979:29; Roosevelt et al. 2002:175). A pattern of older dates in the west and more recent dates in the east suggest that the NWMt culture spread east from Beringia (Ackerman 2007:147; Dixon 1985:54; 1999:175-176; Magne and Fedje 2007:171; Powers et al. 1983:57-61). The NWMt seems to have been common in central Alaska by about 10,600 BP, and lasts there until at least 5,000 BP (Dixon 1985:54; 1999:175-176; Magne and Fedje 2007:171; Powers et al. 1983:57-61), and possibly even as late as about 1,000 BP (Ackerman 2007:147; Dixon 1985:57). NWMt dates as recent as the Historic period may be associated with Athapaskan speakers at Great Bear Lake (Clark 2001b:64; Magne and Fedje 2007:177, 182). Although the known extent of the NWMt territory lies outside of our research area in the Clearwater River Valley (Figure 3.1a), it comes close to and is connected by river drainages. The closest NWMt site found to our research area is the Bezuya site near Fort

MacKay in the Athabasca River Valley (Figure 3.1b), which is dated to about 3,990 BP (LeBlanc and Ives 1986:81).

The spread of microblade technology from Beringia to Alaska and east into the Northwest Territories and northeastern Alberta, and the possible relationship between the use of microblade technologies and Athapaskan speakers have led some archaeologists to believe that the southeastward spread of the NWMt may be indicative of the migration of Athapaskan people (Magne and Fedje 2007; Matson and Magne 2007; Magne and Matson 2010:219). The correlation between the range of microblade use and the historical range of Athapaskan speakers has been noted since the 1960s and 1970s (Krauss and Golla 1981:67; Younie 2008:13) and has been used to strengthen the Athapaskan migration hypothesis (Magne and Fedje 2007:184; Matson and Magne 2007:185; Younie 2008:14). However, the problem of equifinality may be at play here and we need to question whether the interpretation of the archaeological record indicates the actual movement of a biological population (migration), the movement of an idea (diffusion), or possibly independent invention. All three modes could leave a similar archaeological signature and have been used to explain occurrences of NWMt assemblages in northwestern North America (Clark 2001a:181; 2001b:70; Ives 1990:33; 2008; Wright 1995:171).

3.4.1.2 Pre-Dorset

At about 3,500 years ago, the climate turned very cold relative to present in the Barrenlands and the Arctic (Andrews and Nichols 1981; Bryson et al. 1965; Gordon 1996:8; Meyer 1977:42; 1983a:148; Pettipas 1989:9). The vegetation responded with a southern movement of the boreal/Barrenlands transitional forest, as well as a southern movement of the Plains ecoregion (Andrews and Nichols 1981; Bryson et al. 1965; Hickman and Schweger 1996:174; Meyer 1983a:148; 1995:56). Bison were no longer available as far north as they had previously been, and Plains-adapted cultures would have responded accordingly. Plains cultures would likely only have gone as far north as the migrations of bison that they depended. The Shield Archaic culture that occupied the Barrenlands during this period is thought to have moved southeast into what is now northern Manitoba (Figure 3.1a; Gordon 1996:239). Facing worsening climatic conditions on the Arctic coast as well, some of the Pre-Dorset peoples quickly moved into the interior of the continent, filling the resulting void (Gordon 1996:239). It

is important to note that a Pre-Dorset occupation also remained throughout the Arctic (Meyer 1977). It is likely that the interior occupation would have been brief, occurring sometime between 3,500 to 2,700 BP (Gordon 1996:239). The ancestors of these people were coastal sea mammal hunters, but changed their subsistence strategy to hunting barren-ground caribou (Meyer 1983a:148).

The Pre-Dorset archaeological culture is quite different from the previous cultures of northern Saskatchewan in a number of ways. The Pre-Dorset used a composite tool technology that included projectile points that consisted of stone end and side blades slotted into bone implements (Gordon 1996:239). A possible Pre-Dorset site was found at the Firebag Hills-headwaters of the Deschambe River area (Figure 3.1b; Reeves et al. 2011); however, this interpretation is disputed (Somer et al. 2009:364). Similar technology has been found in the Fort MacKay area (Figure 3.1b; LeBlanc and Ives 1986), and the Lake Athabasca area (Wright 1975:150-151 figure 3, 156-157 figure 8). Side blades have also been found further south in the Cold Lake area (Figure 3.1a; Fedirchuk and McCullough 1992:60). A blade-like flake, a possible amorphous blade-like core, and burin technology were also found on the Clearwater River during this research. If these artifacts are culturally affiliated with Pre-Dorset, it may suggest that caribou migrations extended at least as far as the southern portions of the Clearwater River, or close to it, during this time frame.

3.5 The Late Precontact period in northwestern Saskatchewan

The Late Precontact period in northwestern Saskatchewan consists of Taltheilei and Late Woodland cultures. This period begins about 2,700 years ago and ends with the first European/Canadian fur traders entering this area circa AD 1774.

3.5.1 Taltheilei

The Taltheilei tradition was the next to move into the region about 2,700 years ago (Gordon 1996; Meyer 1983a:150). The Taltheilei peoples were a highly mobile culture that subsisted mainly by hunting barren-ground caribou (Gordon 1996). Taltheilei is further split up into Earliest, Early, Middle, and Late Taltheilei (Gordon 1996). Taltheilei projectile points are found at La Loche, Saleski Lake, Buffalo Narrows (Figure 3.1a and 3.1b; Millar 1997), McKusker Lake (Figure 3.1a; Meyer 1983a:162) and possibly as far south as Cold Lake (Figure

3.1a; Fedirchuk and McCullough 1992:43). Taltheilei is very well represented around the eastern portion of Lake Athabasca, Black Lake, and Cree Lake (Gordon 1996). Noble (1971) sees continuities in projectile point attributes and archaeological assemblages from Taltheilei to historic Athapaskan groups in the Mackenzie District (Figure 3.1a); and further suggests that Taltheilei archaeological assemblages represent ancestral Dené whose descendents continue to live and hunt in the Clearwater River area. As previously mentioned in section 3.3 and 3.4 of this thesis, errors may exist because there may be some difficulty in distinguishing some Taltheilei projectile points from Paleoindian and Middle Precontact period points (Harp 1961:53; Irving 1968:38 McGhee 1970:64).

3.5.2 Late Woodland period

The introduction of pottery to the Buffalo Narrows area with Narrows Fabric-impressed ware of the Buffalo Lake Complex (Figure 3.1a and 3.1b) signaled the beginning of the Late Woodland period here about 700 BP, ending with the Kisis Complex of the Selkirk composite at about 200 BP (Paquin 1995:124; Young 2006:13). While there are similarities between the Narrows Fabric-impressed ware and the Selkirk composite, and both overlap in time here, it is likely that the later Selkirk pottery signals the introduction of a distinct group of people (Young 2006:190). Selkirk pottery is seen in assemblages at McKusker Lake in the Grizzly Bear Hills, as well as at Buffalo Narrows (Meyer 1983a:162; Paquin 1998: 106). A precontact pottery sherd that is most likely Narrows Fabric-impressed Ware (Figure 3.2; David Meyer, personal



Figure 3.2. Body sherd of Narrows Fabric-impressed ware from Lac La Loche (Steer 1977).

communication 2008) was found in an excavation at the north end of Lac La Loche (Figure 3.1b; Steer 1977), and this type is well represented in the Buffalo Narrows area (Paquin 1995; Young

2006). The distribution of the Selkirk Composite spans from northern Lake Superior, throughout the Churchill River System to Peter Pond Lake, while the Buffalo Lake complex centres around the Buffalo Narrows area, but Narrows Fabric-impressed ware potentials spans from east central Alberta to central Saskatchewan (Meyer and Russell 1987; Young 2006:199).

Meyer (2010:26) suggests that rock art along the upper Clearwater River is consistent with the Selkirk culture; however, no Selkirk pottery, or any precontact pottery for that matter, has been found in the Clearwater River Valley. Selkirk pottery has been attributed to Algonquian-speaking people, who were likely ancestral to the Cree (Meyer and Russell 1987:25-27). Historic records note that Algonquian speakers did inhabit the Athabasca River by AD 1755 (Russell 1990:314-315), but it is interesting to note that there is also an absence of precontact pottery on that river. This may suggest a relatively recent migration into the Clearwater River and Athabasca River drainages of Algonquian speakers who had already discontinued their use of pottery in favour of the metal kettles that the Fur Trade provided. An alternative is that the Clearwater River and Athabasca River were inhabited by non-pottery-using Algonquian speakers. In any case, the absence of woodland pottery north of Lac La Loche suggests that the height of land separating the Mackenzie River drainage and the Churchill River drainage may have served as an ethnic boundary during Late Woodland period (Figure 3.1b). In AD 1784, a smallpox epidemic drastically reduced the numbers of the Algonquian speakers in this area and allowed a southward movement of Dené people into the Lac La Loche area (Figure 3.1a and 3.1b; Ray 1998:98).

3.6 Ethnographic/Ethnohistoric period

The Clearwater River is a part of the traditional territory of the Historic and ethnographic Chipewyan people (Bush and Rowell 2000; Donahue 1976:47; Johnson and Weichel 1982:25-27). The word “Chipewyan” itself is an altered form of a Cree word meaning pointed skins, which was a reference to the pointed shirt tails that these people wore (Athabasca Chipewyan First Nation 2003a:27; Smith 1981:283). A more culturally sensitive term is Dené, which simply means “the people” in their language (Athabasca Chipewyan First Nation 2003:27). However, it should also be noted that this is an oversimplification, and the term Dené can also include a subset of cultural groups, including the Chipewyan, Yellow Knife, Dog Rib, Slavey, and Sahtu First Nations people, who identify with one another, but also differentiate themselves from other

Athapaskan language speakers (Gillespie 1981:168). In the past and present, the term Dené has been used to describe a single cultural subgroup of Athapaskan speakers, all Athapaskan speakers, only Northern Athapaskan speakers, and only Canadian Athapaskan speakers (Gillespie 1981:168). Further complicating the matter is that within the cultural subgroup of Chipewyan Dené, there are also groups of people that differentiate themselves from each other, including the *Kesyeho' ine*, who are the southern group that live near Ile-a-la-Crosse; the *Kkrest' aylekke ottine*, who live in the area between Great Slave Lake and Lake Athabasca; the *Thilan ottine*, who live near Cold Lake; the *Thei lan ottine* and the *Gank wen Dené*, who are a more northern group living near Fond du Lac (Figure 3.1a; Athabasca Chipewyan First Nation 2003a:45; Brumbach and Jarvenpa 2006:28, 29). All of these groups are descendents of the *Ethen eldili Dené*, who were a highly mobile group that followed the Beverly and Kaminuriak caribou herds during the Late Precontact period and Historic periods (Brumbach and Jarvenpa 2006:26, 28, 29, 35; Burch 1991:440; Sharp 1978: 59). To clarify the information in this thesis, the term “Athapaskan” will be used to denote Athapaskan speaking groups in northern Canada, and the term “Dené” to denote the *Ethen eldili Dené* and/or their descendents.

It has been suggested that the extremely nomadic nature of the Dené changed drastically during the nineteenth and twentieth centuries (Brumbach and Jarvenpa 2006:38); however, until the 1950s migratory caribou were the Dené people's most important food resource and that continued to affect much of their seasonal movements (Athabasca Chipewyan First Nation 2003a:30, 32, 34, 46-47; Burch 1991:441-443; Holland and Kkailther 2003:13,166; Jarvenpa and Brumbach 2006:35, 39, 55; Kendrick et al. 2005:177; Sharp 1977:379; 1978:56-60, 72; Smith 1976:14; 1978: 68; Smith 2004:73). A southern and a northern traditional seasonal round have been distinguished among the Dené during the ethnographic and Historic period (Brumbach and Jarvenpa 2006:29, 30). The southern round does not involve the Clearwater River, but the northern one does, so that will be the one described in more detail here. It is important to note that, although most Dené followed one of these two seasonal rounds, there was also much variability in their movements and social organization depending on resource abundance or the lack of it (Brumbach and Jarvenpa 2006:39; Smith 1976:14; 1978).

Historic Dené spent much of the summer concentrated in bands along the Athabasca River near Fort McMurray, Fort Chipewyan, Lake Athabasca or Fond du Lac, trading on their way to the Barrenlands (Figure 3.1a; Athabasca Chipewyan First Nation 2003a:48; Brumbach

and Jarvenpa 2006:30; Hearne 2007:231). They had little to do with caribou during this season, and spent it fishing, picking berries, and hunting smaller terrestrial animals (Athabasca Chipewyan First Nation 2003b:66; Smith 1978:76). In the fall, they would move to the forest edge above Lake Athabasca to intercept the caribou during their southern fall migration, then follow the caribou south to their wintering grounds near the Cree Lake area (Figure 3.1a; Athabasca Chipewyan First Nation 2003a:48; Brumbach and Jarvenpa 2006:30; Holland and Kkailther 2003; 8). The Dené would spend the winter in the same area as the caribou (Brumbach and Jarvenpa 2006:30). In general, they would disperse into smaller, generally kin-based, hunting units (Brumbach and Jarvenpa 2006:30). However, this was also an important time for gatherings where different Dené groups would aggregate for a period of time (Brumbach and Jarvenpa 2006:30). Historic accounts of aggregations of as large as about 40 tents were witnessed during the winter season (Fidler 1934:532). An aggregation during the late spring would take place at the headwaters of the Clearwater River (Athabasca Chipewyan First Nation 2003a:48; Brumbach and Jarvenpa 2006:30; Holland 2002:40, 49, 52, 53). Shortly after the spring break-up of the river, once it was safe for canoe travel, the Dené would migrate down the Clearwater River to the Athabasca River near Fort McMurray (Figure 3.1a; Jarvenpa 2004:157).

Winter and spring aggregations were very important to the Dené people of northwestern Saskatchewan. An aggregation centre was where people would conduct business, perform ceremonies such as marriages, and exchange goods and ideas (Meyer and Thistle 1995; Smith 1978:76). As such, aggregation centres would bring people in from the immediate cultural group, and possibly people from friendly neighboring groups. Dené aggregations took place on the Clearwater River from the Fur Trade period (Brumbach and Jarvenpa 2006:30) to as late as the 1940s (Holland 2002:52-53). It is thought that these aggregations occurred near the headwaters of the Clearwater River (Figure 3.1a; Athabasca Chipewyan First Nation 2003a:48; Holland 2002:53; Brumbach and Jarvenpa 2006:30), and not as far south on the Clearwater River as our research area. During the 1800s, these aggregations would occur during the late spring, prior to a general dispersion of Dené down the Clearwater River to the Athabasca River, where some people would stay briefly in the Fort McMurray area and others would further disperse to the Fort Chipewyan and Fond du Lac areas (Athabasca Chipewyan First Nation 2003a:48; Brumbach and Jarvenpa 2006:30). This is also the period of time that the Beverly Caribou herd begins their migrations northward from their winter range (Beverly and Qamanirjuaq Caribou

Management Board 1999:8).

3.7 Historic period

In 1766, Louis Primeau of the HBC ventured into the interior and was the first Euro-Canadian to trade in the Churchill River area and reap the rewards of high-quality furs originating from the Athabasca District (Steer 1977:28). The Frobisher brothers, who held major interests in what would later become the Northwest Company, seized the opportunity to hire Primeau in 1773, leading to a secure domination of the inland Fur Trade for the remaining portion of the eighteenth century (Parker 1987:5; Steer 1977:28). With the prospect of obtaining high-quality furs directly from the Athabasca District and the consent and blessing of the Northwest Company, American-born explorer and trader Peter Pond was the first documented Fur Trader to venture into the Athabasca District, arriving via the Methye Portage and Clearwater River in 1778 (Figure 3.1b; Gibson and Russell 1991:5, 8; Parker 1987:xii, 6; Steer; 32). Pond subsequently built the first trading post in the Athabasca District. Although the Clearwater River would have been an important transport route funneling valuable furs from the Athabasca district before Pond's explorations and subsequent post, this signaled the beginning of the importance of the Methye Portage and Clearwater River as a major transportation route for further Euro-American and Euro-Canadian explorers. The Methye Portage and the Clearwater River retained this importance until the 1880s and 1890s, when it was eventually phased out in favour of alternative routes (Gibson and Russell 1991:20; Steer 1977:82). Trading posts in the Methye Portage area continued to operate into the twentieth century, albeit with much less importance to the Fur Trade. During its period as an important travel route for the Fur Trade and early explorers, the Clearwater River saw the likes of people such as Cuthbert Grant, Alexander Mackenzie, Peter Fidler, Philip Turnor, Malcolm Ross, David Thomson, Joseph Tyrell and Sir John Franklin (Gibson and Russell 1991:21; Parker 1987:10-11, 18, 55; Steer 1977:38, 39, 40, 48).

3.8 Current Cultural Environment

Today, the Dené and Métis and Cree of Fort McMurray (Bush and Rowell 2000; Donahue 1976:47), La Loche, Turnor Lake, Descherm Lake (Figure 3.1b; Johnson and Weichel 1982:25-27), Fort Chipewyan (Husky Oil 2005:1), and surrounding areas identify the Clearwater

River in Saskatchewan as within their traditional land-use area; however, the land itself belongs to the province of Saskatchewan. The Clearwater River Provincial Park was established in 1986 after its nomination and designation as a Canadian Heritage River in 1984 (Hilderman et al. 1985:1; Johnson and Noel 1995:100; Parks Branch 1986). The Canadian Heritage Rivers System is a co-operative venture by both provincial/territorial governments and the federal government (Canadian Heritage River System 2000:1). This provincial/federal body is concerned with the protection and management of Canadian rivers that possess “outstanding heritage value” (Canadian Heritage River System 2000:1). To qualify as a Canadian Heritage River, a river must rank as being significant under three different criteria: natural heritage, human heritage, and recreational value (Johnson and Weichel 1982:38). The Clearwater River, especially the Saskatchewan portion of the river, was considered as ranking high under all three criteria (Johnson and Weichel 1982:38-39). Its status as a Saskatchewan Provincial Park, as well as a Canadian Heritage River, has generated both provincial and federal attention to documentation and conservation of its heritage resources.

3.10 Conclusion

In general, archaeological cultures in northwestern Saskatchewan can be split into three distinct groups: Plains-adapted, Barrenlands-adapted, and boreal-forest-adapted. Throughout the majority of the Precontact period, the people that occupied the southern portion of northwestern Saskatchewan maintained Plains-adapted cultures. Environmentally, this suggests that the Northern Plains once extended into, or very close to this area, supporting large herds of Plains bison (Millar 1997:93). Our understanding of Northern-Plains-adapted bison hunters primarily comes from the archaeology that has been conducted in much more southern areas of the Northern Plains. It indicates they were specialized hunters who increased their hunting efficiency through large communal hunts, at least in the later part of the sequence. However, faunal evidence and blood residue analysis from the Fort MacKay and Cold Lake areas suggest that these more northerly precontact hunters were not as specialized, using a more opportunistic and generalized hunter-gatherer strategy (Fedirchuk and McCullough 1992:132; Parr 2007). It is most likely that the precontact hunters of the southern portion of northwestern Saskatchewan followed this type of lifestyle, opportunistically hunting and gathering the wide array of

resources that were available to them; however, it is also likely that these people focused on large mammal hunting during portions of their seasonal rounds.

By the end of the Middle Precontact period, cultural groups in the Clearwater River area were likely dependent on barren-ground caribou. As discussed in the last chapter, the Beverly caribou herd currently winters in the northern most portions of Saskatchewan (The Beverly and Qamanirjuaq Caribou Management Board 1999:22-35). Caribou herds have a somewhat predictable migration-cycle. In the spring, the Beverly herd would be in its calving grounds in the Barrenlands of Nunavut; in the fall it would migrate south toward the boreal forest of Saskatchewan's Athabasca area where it spent the winter (The Beverly and Qamanirjuaq Caribou Management Board 1999:8). Dependent on this resource, ancient hunters would have followed the migration of these barren-ground caribou, spending the spring and summer in the northern portion of the Beverly caribou range, and spending winters in the Athabasca Region (Gordon 1996; Meyer 1983a:141; Minni 1975; Wright 1975). Although barren-ground caribou ranges have shifted due to changing environmental conditions over the last 8,000 years, the human strategy of following these herds has most likely been similar throughout the entire 8,000 years of precontact history in the Athabasca Region (Meyer 1981a). The Clearwater River would have been the southern reach of these herds during at least some periods of the last 8,000 years. These herds would have brought northern-adapted cultures that depended on these animals to the Clearwater River area or alternatively, *in situ* cultures would have adapted to a seasonal abundance of these animals, possibly coming in contact with more northern groups and borrowing their technology.

During the early portion of the Woodland period (700-200 BP), the height of land separating the Clearwater River (the Mackenzie River Drainage) and Lac La Loche (the Churchill River Drainage) most likely served as a boundary between the Athapaskan-speaking people responsible for the Taltheilei archaeological culture and the people who produced the Algonquian-speaking Selkirk archaeological culture (Figure 3.1a and 3.1b). The Selkirk people would have had a different lifeway, being less mobile and subsisting on the more diverse range of foods available in the Churchill River System. By AD 1755, Algonquian peoples migrated into the Clearwater River area. Later in the same century, smallpox decimated a high proportion of these people leading to a southern regression of their territory. The Dené then re-occupied the Athabasca/Clearwater River area.

The Methye Portage and the Clearwater River was of utmost importance during the Fur Trade period (Figure 3.1b). The Methye Portage functioned as a funnel for abundant high-quality furs from the Athabasca District. This travel route retained its importance for over 100 years before it was phased out during the later portions of the nineteenth century. The Clearwater River has seen a large variety of different adaptations because of its unique position between the Northern Plains to the south and the boreal forest to the north over the last 10,000 years. Climate change has shifted the boundaries of these important ecozones so that the Clearwater River has been influenced by both during some time in its human history; furthermore, this area has also seen boreal-forest-adapted Algonquian speaking people during the Late Precontact/Historic period.

CHAPTER 4: METHOD

4.1 Logistics

The boreal forest of northwestern Saskatchewan, much like other areas of the Canadian boreal forest, is quite inaccessible because much of it is covered by wetlands, lakes, and rivers making it difficult and expensive to construct roads. J.V. Wright (1972:1) stated that, although some areas of the boreal forest region were becoming more and more accessible through time, “. . . it will be many years before canoe survey supported by air charter can be replaced as the most effective, indeed only, method of obtaining the necessary data for archaeological reconstructions.” Almost forty years later this statement remains quite accurate, so his recommended approach was used in this research.

Logistically, the Clearwater River Valley in Saskatchewan is difficult to access. There is only one road offering direct access to the Clearwater River in Saskatchewan, at the Clearwater Provincial Park Campground, about 65 km north of La Loche on the Semchuck Trail (Highway 955) (Figure 4.1). Indirect accesses include the Methye Portage, which starts at the north end of Lac La Loche and ends at the Clearwater River, as well as from Lloyd Lake, about 55 km north of the Clearwater Provincial Park Campground on the Semchuck Trail (Figure 4.1). Float plane access on the Clearwater River is variable, depending on water levels and shifting sandbars. Previous to our 2008 field season, float planes were able to land in the portion of the river close to the Methye Portage, as well as at the bottom of Whitemud Falls, several kilometers west of the Saskatchewan/Alberta border (Figure 4.1; Archer 2003:113). One of these two pickup locations was originally intended to be used; however, in the summer of 2008, the accesses at Methye Portage and Whitemud Falls were inaccessible via float plane because of obstructions created by shifting sand bars. The only float plane access on the Clearwater River west of the Semchuck Trail was just below Contact Rapids (Figure 4.1, Figure 4.2). An alternative to air support that has been used in the past is river boat (Ric Driediger, personal communication 2008); however, riverboats were also unable to access us at the bottom of Whitemud Falls during the 2008 season due to shifting sandbars. Because this research project did not have the time or fiscal budget to extend the fieldwork portion of this research to Fort McMurray or to use helicopter support, Contact Rapids was chosen as the ending point (Figure 4.1). The resultant area surveyed was the stretch of river valley between Warner Rapids Bridge and Contact Rapids (Figure 4.1).



Figure 4.1. Survey area logistics (after Garmin International Inc.).



Figure 4.2. Our floatplane on the river below Contact Rapids.

The upper portions of the Clearwater River, which include our survey area, contain stretches of fairly extreme white water (Figure 4.3; Parks Branch 1986:5); furthermore, the secluded nature of the Clearwater River, as well as the survey work that was to be completed, needed some extensive backcountry camping knowledge at a professional level. This necessitated the hiring of a professional canoe outfitter.



Figure 4.3. White water at Gould Rapids.

Web resources and guide books further aided our navigation of this challenging river. Two sources that were particularly helpful were Laurel Archer's *Northern Saskatchewan Canoe Trips* (2003), and Greg Marchildon and Sid Robinson's *Canoeing the Churchill: A Practical Guide to the Historic Voyager Highway* (2002).

4.2 Survey Methodology

Because very little archaeological research had been previously conducted on the Saskatchewan portion of the Clearwater River Valley, one of the primary goals of this research was to determine the nature of the archaeological remains in this portion of the valley. The methodology which best fit this goal was to conduct a reconnaissance or exploratory survey (Meyer 1983b:35; Ruppe 1966:314-315). This method of survey is extensive in nature, is not systematic as well as being judgmental; therefore, it does not provide a representative sample (Ruppe 1966:314). This method does, however, allow archaeologists to evaluate large survey areas (Meyer 1983b:35), such as our survey area. This archaeological survey was conducted in areas that were accessible and in areas which were deemed as having high archaeological potential.

Archaeological potential was assessed before the commencement of fieldwork with the aid of topographic maps, satellite imagery, and canoe guide books. Five factors, in no particular order of importance, were used to determine archaeological potential: 1) areas of geological interest; 2) portage areas and campsites; 3) river confluences; 4) well drained and level landforms; and 5) areas where the subsurface was exposed were important, not because they were a factor determining high archaeological potential, but because areas where they occurred offered high archaeological visibility, and could be quickly and easily surveyed. Although archaeological potential was estimated previous to the commencement of fieldwork, the project retained the flexibility to investigate areas that were found to be more accessible and were found to be suitable camping areas while journeying down the river. Because of time limitations and the large area that was covered, all areas deemed as high potential could not be investigated.

The Dina geological formation, also known as the Lower McMurray formation, is of particular interest to this project, as this is the geological formation in which Beaver River Sandstone is found. There are a minimum of five areas where the Dina formation may have been accessible to past people along the Clearwater River Valley. Because high-grade tool stone was important to precontact people, areas that are in close proximity to naturally occurring tool stone would be attractive to these people. Although the Dina formation is vastly dominated by non-BRS stone types, outcrops of this formation are areas where this toolstone may have been present and therefore procured.

Previous archaeological investigations along the Alberta portion of the Clearwater River by Pollock (1978:32) revealed that portage areas were especially productive for finding archaeological sites along that portion of river. In following this previous archaeological investigation, portage areas were generally considered to have high archaeological potential, especially if they rated high in any of the other criteria. Assessing portages as having high potential makes sense because these are areas where historic and precontact people would need to stop, providing that the river channel has not moved much. There is also a high probability that, if the terrain allowed, people would camp in such locations. Modern campsites along at least some of these portages confirmed this assumption. There are seven portages between the Warner Rapids Bridge and the Alberta/Saskatchewan border. Not all of these portages are mandatory. Mandatory portages were regarded as having higher potential.

Confluences of major rivers and substantial streams were considered areas of high potential. It was felt that river confluences may have been potential transportation crossroads in the past, and thus there would be a higher probability that past people would camp near such areas. Two major examples that occur in the study area are the confluences of the Clearwater River and the Deschermes River, and the Clearwater River and the McLean River. There are also a number of smaller streams running into the Clearwater River in the study area. Many of these are not substantial. Confluences with larger streams were assessed as having a higher archaeological potential because of their relatively larger lengths, which would have provided more substantial transportation access.

Well-drained and level landforms along the Clearwater River were identified through the analysis of topographic maps and satellite imagery. Such areas may have provided favourable spaces for campsites for past peoples. There were many such areas along the Clearwater River that displayed these characteristics. Particularly, when combined with other favourable traits, such areas were considered as having high archaeological potential.

Although shovel testing as a method of site discovery in wooded areas is not a very effective technique, especially for sparse or deeply buried sites (Ives 1982; Shott 1985), alternative surficial methods are even less effective (Lovis 1976:369). This research project employed both shovel testing and surficial survey of exposed areas. Shovel tests comprising 40 cm x40 cm holes were dug to a depth of at least 40 cm in areas of high archaeological potential. Deeper tests would have been more difficult to accomplish, as well as being impractical, because

of the extra time involved in their digging. The earth from within these shovel tests were sorted through with a mason's trowel or screened through a 4 mm-mesh screen. Screening was the most common method used in this project because it was more thorough and when employed by our relatively unskilled crew, was actually faster than sorting through with a mason's trowel. The matrix comprising the majority of shovel tests in this project was granular sand that was easily screened. The object of this exercise was to find buried artifacts as evidence of past human habitation or use.



Figure 4.4. Typical subsurface shovel test.

Finding some type of archaeological evidence in a shovel test resulted in more in-depth study of the area to define the size and richness of the site. At times a slightly larger shovel test comprising a 50 x 50 cm hole dug to a depth of 40 to 50 cm would be used to further define the site. Shovel tests were dug in 10 m or 5 m intervals in each cardinal direction to assess the size of the site. In circumstances where a site sat on a landform that did not allow for this strategy, alternative directions or a modification of this strategy would be used.

Non-destructive survey methods were also used. Surficial survey was employed in areas where subsurface soil was exposed, such as cutbanks, road cuts, all terrain vehicle (ATV) trails, game trails and trails created by humans (e.g. Figure 4.5). These exposures were usually in the form of cutbanks along the river and were also often in areas that displayed other characteristics

that were associated with high archaeological potential. Other areas that were surficially surveyed were those that lacked vegetation, such as recently fire-burned areas and frequently used modern camping spots. Some Precambrian outcrops and exposed rock faces were visually inspected for rock art and other archaeological evidence. Exposed areas were treated as being important to this survey because they provided us with the ability to examine the subsurface of relatively large areas quite quickly.



Figure 4.5. Cutbank exposure at HeOi-3.

Documentation during this fieldwork was stressed. All of the areas that were surveyed, both positive and negative, were documented in a project journal with supporting digital photograph numbers and Global Positioning Satellite (GPS) waypoint references. Each member of the crew was given a GPS and a personal journal to record and number each individual shovel test. Personal observations were also recorded in these journals throughout the survey. The tracking feature was utilized on each GPS to record the exact area that each individual had surveyed. When a site was found, a detailed site map was sketched into a journal with a GPS location of each shovel test within that site, as well as what artifacts were found in each positive test. Artifacts were all placed in a separate bag and labeled with the date, site number, shovel test number and initials of the crew member who found the artifacts. An electronic record of the GPS tracks and shovel test locations, as well as a hard copy research report documenting each site were sent to SARMS (Korejbo 2008b; 2008c). Documentation of vegetation and landforms throughout the valley was taken in the form of journal notes, digital photographs, and GPS waypoint locations. After the fieldwork, the identification of vegetation was facilitated by

Louise Seidel in Saskatoon. All digital fieldwork photos, as well as a hard copy of an annotated photo index, were sent to Saskatchewan Tourism, Parks, Culture and Sport, Parks Service (Korejbo and Seidel 2009).

4.2.1 Assessment of naturally vs. culturally fractured stone

Since the discovery of an archaeological site is predicated on finding cultural material, recognition of whether objects are modified through cultural processes or natural processes is of utmost importance. Most of the archaeological evidence found in this project was in the form of lithic debitage; only a few formal stone tools were found. This is not uncommon with archaeological investigations (Odell 2004:118). Separating debitage, which is a byproduct of cultural behavior, from natural processes is important in such a study, but especially so in our area because of the predominant use of quartz here. Three factors were used to determine if the stone was cultural or natural: 1) specific attributes on lithic debitage which are characteristic of cultural modification; 2) the context where the debitage was found, and; 3) the lithic material from which the debitage was manufactured.

Stone that has been fractured by humans generally shows specific diagnostic characteristics, such as displaying a bulb of percussion, ejection scars, and undulating ripple lines or compression waves (Kooyman 2000:12-13; Patterson 1983:299-301). If no such attributes can be found, the stone is usually deemed a product of some natural fracturing phenomenon such as cryogenic processes. A problem that was encountered in this project was the relatively poor fracturing quality of the most abundant toolstone, quartz. Quartz has poor knapping qualities because it is extremely hard and it is difficult to find raw material that lacks cleavage planes and flaws that cause premature and unpredictable breakage during the knapping process (Stork 2004:180). Although some of the quartz debitage did display attributes indicating that it was a result of human activity, some of it did not. The inclusion of non-attribute-displaying pieces as cultural was generally based on their association with attribute-displaying artifacts. In other words, when fractured rock that did not have any cultural attributes was found in the same shovel test as fractured rock that did have cultural attributes, all fractured materials from that test were considered of cultural origin.

The sediment in which the debitage was found was also taken into consideration. Sand is characteristic of much of the area that was surveyed. A typical negative subsurface test would

consist entirely of fine grained sand; larger clasts would not be evident. Therefore, any clasts larger than a grain of sand were often suspected as cultural material. In general, finding fractured material that did not display cultural attributes in conjunction with materials that did in an area where the matrix consisted entirely of sand helped to support the cultural nature of all of the lithic fragments.

Some finds, especially on roads, can be deceiving because heavy equipment and traffic have driven over stone outcrops, leading to the fracture of rock that could be mistaken for cultural. This problem was especially evident in the first site that was found at the Clearwater River Provincial Campground (Figure 4.6). There was a road going over a Precambrian outcrop



Figure 4.6. Road going over a Precambrian outcrop at HfOf-4. The white dashed line indicates approximate area of outcrop. Debitage was found throughout the entire exposed area visible in the photograph.

at this site. The “smoking gun” that indicated the presence of a site at this location were artifacts made from a material that is not natural to this area, namely Beaver River Sandstone. The artifacts made from Beaver River Sandstone also displayed attributes of culturally fractured

stone. Because of this, all other fractured stone materials that were found here were considered the remains of human activity.

The material that the artifact is made from is also important when determining if stone is cultural or natural in character. Edged stone tools, in order to be effective, need to be made from strong and hard material. Materials that are soft are unlikely to be of utility for edged stone tools. Materials found that would crumble and break under little stress would not likely be cultural. However, some softer materials were collected as a different class of cultural material - fire broken rock (FBR). Fire broken rock also displays particular characteristics that make it identifiable. Some of these characteristics are charcoal staining or other discoloration associated with burning, and/or variably angular breaks characteristic of thermally shocked stone (Kooyman 2000:136; Rapp et al. 1999:73-74).

4.2.2 Assessment of heat treatment

Heat treatment is the intentional heating of lithic materials for the purpose of improving their fracture properties (Domanski and Webb 2007:154). A common visible result of heat treatment is a change of colour in the raw material to a reddish hue (Kooyman 2000:65). This seems to be particularly true with Beaver River Sandstone, which develops a thin reddish rind around the exterior when heated (Figure 4.7; Robertson and Blythe 2009; Gryba 2001:v-vi). Caution must be taken because finding the reddish rind on Beaver River Sandstone is dependent on whether or not the flake was situated near the outside of the rock when it was heat-treated. While the detection of a reddish rind seems to be an indication that Beaver River Sandstone has been heat-treated, artifacts without this characteristic may have also been heat-treated. Further caution must be taken as iron from the soil matrix could leave a reddish stain; however, a subjective opinion from this researcher is that iron staining from an iron-rich matrix is more likely to leave an orangish hue on Beaver River Sandstone artifacts as opposed to a reddish one. Robertson (2011:11) has also noted that the overall colour of Beaver River Sandstone changes from a dark-gray to a light-gray and white with a reddish interior after heat treatment. Unfortunately, an objective method of testing for the definitive use of heat treatment has not yet been achieved, so a subjective characterization based on the observation of a reddish rind or reddish staining has been used.



Figure 4.7. Colour change characteristic of heat-treated BRS (top left portion of the right flake). In contrast, the flake on the left does not display characteristics of heat treatment.

4.3 Laboratory methodology

Artifacts collected during our survey were cleaned in the laboratory at the University of Saskatchewan Department of Archaeology and Anthropology. Lithic artifacts were cleaned with water and a soft brush. Faunal material was gently dry-brushed to avoid damage. All of the faunal material found during this fieldwork was highly fractured and unidentifiable, with the exception of the bone hide scraper found at HeOi-8.

Each lithic artifact was given a catalogue number. A GPS waypoint number was recorded for each artifact found on the surface or in shovel tests. These waypoint numbers can be cross referenced with a list on file at SARMS for the exact provenience, given in UTM coordinates, of each artifact. The length, width and thickness of each piece were measured with Vernier calipers to the nearest hundredth of a centimeter. The weight of each piece was measured to the nearest tenth of a gram. The raw material type was also characterized in the laboratory as per section 2.8, Lithic Materials. The color of each artifact was determined using the Munsell Colour System. The amount of cortex, if any, was also estimated. Lithic artifacts were categorized as flakes, shatter, retouched flakes, bifaces, cores, burins (or pieces displaying burin technology), FBR, endscrapers, sidescrapers, bifaces, preforms, and broken tools. Flake attributes of platform width, length, completeness, and numbers of dorsal flake scars were noted, as were evidence of heat treatment and any other peculiar characteristics of the artifact. All of these attributes were documented in a research log as well as a Microsoft Access database. The characterization of lithic material as well as artifact type will be further discussed in the analysis

section of this thesis. Digital photographs were taken of all of the retouched flakes, bifaces, cores, burins (or pieces displaying burin technology), endscrapers, preforms and broken tools.

Laboratory work also aided in the identification of a new archaeological site following the completion of the fieldwork. HeOh-3 was not designated as an archaeological site until the artifacts were cleaned and analyzed under a microscope in the laboratory and found to be cultural in origin. The possibility of this location being a site was anticipated in the field, and all of the required information, including site map, extra shovel tests to define the site area and GPS waypoints, were acquired in the field.

4.4 Conclusion

Logistical challenges were faced in this research because of the inaccessibility of the Clearwater River in northwestern Saskatchewan. These challenges are similar to those faced by others who have conducted archaeological investigations in the boreal forests of Canada. An established boreal forest logistical strategy based on canoe travel supported by air charter was used in this research. This survey commenced at the Clearwater River Provincial Park Campground, where the Semchuck Trail crosses the Clearwater River and is the only access available to car or truck to this river. A float plane was chartered to pick up the survey team about 55 km downstream nine days later at the bottom of Contact Rapids. This was the only location of the river west of the kickoff area that a float plane was able to land and takeoff. A canoe guide was needed to navigate the extreme whitewater that characterizes this portion of river and assist in the backcountry camping that was necessary for this fieldwork.

Very little archaeological research has previously been conducted in the Saskatchewan portion of the Clearwater River Valley. Because of the sheer size of the survey area and the lack of previous research conducted in this area, a reconnaissance or exploratory survey was utilized, and only areas of high archaeological potential were investigated. Archaeological potential was determined with the help of topographic maps, geological maps, satellite imagery, and canoe guide books, prior to the commencement of fieldwork. It was assessed based on five factors: 1) areas of geological interest; 2) portage areas and campsites; 3) river confluences; 4) well drained and level landforms, and; 5) areas of subsurface exposures. The survey also retained the flexibility to survey areas that appealed to our better judgment while journeying down the river. Both surface and subsurface survey methods were employed to detect archaeological sites during

the fieldwork. In one instance, an archaeological site was only confirmed after the fieldwork had been completed and the materials had been cleaned and analyzed under a microscope in the laboratory (subsection 4.3).

Lithic debitage was the primary class of artifact found by this study, although some tools were also found. The most commonly used toolstone in this area is quartz. Because of the poor fracture qualities of this stone, the assessment of naturally fractured vs. culturally modified rock was difficult. Three factors were used to determine archaeological sites during this fieldwork: 1) specific attributes of lithic debitage which are characteristic of cultural modification; 2) the context of the debitage, and; 3) the lithic material from which the debitage was manufactured.

Artifacts that were collected from fieldwork were further analyzed at the University of Saskatchewan laboratory. These artifacts were catalogued and specific attributes were recorded. These attributes included length, width, thickness, weight, raw material type, color, and artifact type for all debitage. Flake attributes of platform width and length, completeness, and numbers of dorsal flake scars were also noted when applicable.

CHAPTER 5: SURVEY RESULTS

5.1 Introduction

This fieldwork resulted in a total of seventeen sites being recorded (Figure 5.1); sixteen of those sites are being protected under the Heritage Property Act. One site was not approved for protection under the Heritage Property Act, but is still noted as a heritage site in this study because of its possible heritage importance (Figure 5.1). More detail will be provided in the following subsections. The sites, in the order that they were found, are HfOf-4, HfOh-1, HfOh-2, HeOh-1, HeOh-2, HeOh-3, heritage site (not given a Borden number), HeOi-1, HeOi-2, HeOi-7, HeOi-3, HeOi-8, HeOi-6, HeOi-9, HeOi-4, HeOi-5, and HeOj-1 (Figure 5.1). There was one area, Gould Rapids portage, that was surveyed, but where no sites were found. This area will also be discussed in this section because this negative result was unexpected. At request from SARMS, the exact UTM coordinates of the sites will not be given to protect them from vandalism or pot-hunting. For similar reasons, maps will not be highly detailed. Refer to the report for type A research permit number 08-207 on file with SARMS for accurate coordinates and site maps (Korejbo 2008b).

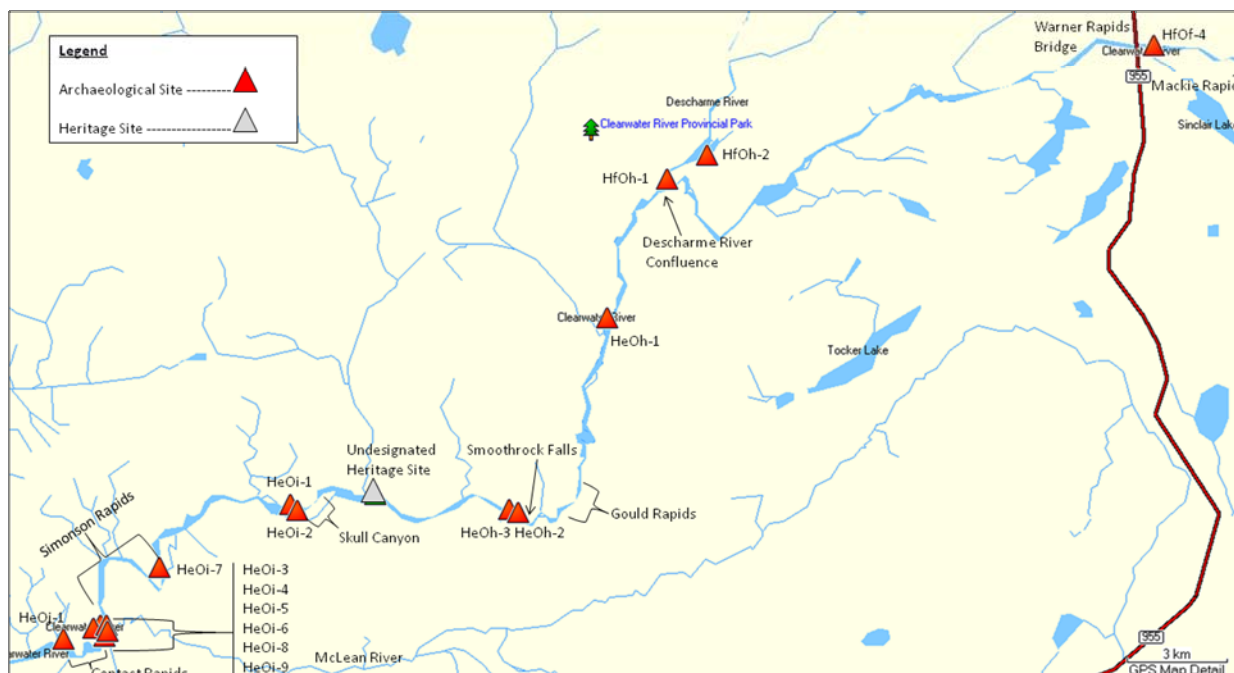


Figure 5.1. Map of study area and sites recorded (after Garmin International Inc.).

For the most part, the site numbers coincide with the chronological order in which the sites were found; however, this is not always the case. In some cases, some sites were not designated as such until after the recoveries from them were analyzed in the laboratory, and assignment of Borden designations to several others was not confirmed until after discussions with more experienced archaeologists at the University of Saskatchewan and at the Heritage Branch. The sequence in which the sites and areas are presented corresponds to the order in which they were discovered during our survey.

Each site that was discovered during our survey will have its own section incorporating a physical description of the site, any special notes on the survey methodology, and results of the survey, which will include the proportions of lithic materials found at that site as well as an interpretation for the site. Tools found at each site will be mentioned; however, a more detailed description of these tools can be found in Chapter 6. The frequency occurrence of the different lithic materials found at the site will be documented both by weight, as well as by piece count. There will also be a short conclusion of the findings of the entire survey at the end of this chapter. This conclusion will recap the results, as well as synthesize the results, so that the project can be analyzed as a whole.

5.2 Site results

5.2.1 HfOf-4, Clearwater River Provincial Campground

5.2.1.1 Description

An archaeological site was identified at the Clearwater River Provincial Campsite soon after the commencement of this project (Figure 5.1). This site sits on a lower landform where a road that goes through the campsite has exposed sand and artifacts (Figures 5.2 and 5.3). This landform is about 15 to 20 m in width and is separated from a higher landform further up the bank by a Precambrian shield outcropping. There is also a lower Precambrian outcropping between the river and the site, acting as the river's north bank (Figure 5.2).



Figure 5.2. HfOf-4, looking north from the river.



Figure 5.3. Road going through HfOf-4, looking northwest. Circles indicate areas of dense debris scatters.

This site is located between two sets of rapids, Mackie Rapids upriver, and Warner Rapids, which is a series of rapids downriver from the site (Figure 5.1). The most severe section of Warner Rapids is where the river narrows immediately downriver from the site. This narrowing in the river is also where the Warner Rapids Bridge has been placed. The river forms a fairly large pool under the campsite at the head of the rapids. A small creek across from this site flows from the south into the pool-like area of the river (Figure 5.1). We did not investigate this creek, but it is doubtful that it is navigable by canoe.

The vegetation on the higher ground of the landform is mixed forest consisting of Jack pine and white poplar. Grasses and wild flowers such as Reed Canary grass and Canada goldenrod are present in open areas. Slightly shaded areas on the forest floor abound with blueberries and lowbush cranberries. The river's edge is bordered by willows and other riparian and aquatic plants such as common cattail. Given that the Clearwater River Provincial Campsite offers plant diversity as well as level areas suitable for camping, it is not surprising that people would have chosen this location as a camp during earlier historic and precontact times.

5.2.1.2 Results

This site was entirely defined using surficial survey methods. Shovel tests were not used because of time restraints and because shovel tests would have further destroyed the integrity of the site and were simply not needed at this exploratory stage of archaeological investigation. Road, trail, and campground exposures were systematically checked for cultural material by walking in transects of 5 m or less in width. Because of time constraints, only the exposed areas at the bottom of the turnabout and adjacent campsites were surveyed. Exposed shield outcrops were also checked for cultural materials. This archaeological site was deemed to be approximately 35 m in length and approximately 25 m in width, covering an approximate area of 875² m; however, it could be larger if the site extends into the subsurface of unexamined areas.

A total of 102 lithic artifacts were surficially collected from this area (Table 5.1). Of these 102 artifacts, all except for one core was debitage. There were no tools or faunal materials found. All culturally modified pieces of stone were collected. The most common lithic material was quartz (n=79, 77% by piece count, 72% by weight), followed by Beaver River sandstone (n=15, 15% by piece count, 11% by weight), quartzite (n=5, 5% by piece count, 14% by weight), and chert (n=2, 2% by piece count and weight). There was also one piece of shatter from an

unknown material (n=1, 0.8% by piece count, 0.8% by weight). Three pieces of Beaver River Sandstone debitage displayed a reddish hue; given that such color alteration is produced by heating, this suggests that it may have been heat-treated. One piece of chert debitage also displays reddening characteristic of heat treatment. Two of the quartzite flakes appeared to have some cortex on them. Three of the Beaver River Sandstone flakes, 16 of the quartz flakes and one piece of quartz shatter weighed under 0.1 g and were not included in the weight.

Table 5.1. Lithic material by artifact type, HfOf-4

Artifact type	Lithic material									
	BRS		Chert		Quartz		Quartzite		Unknown	
	n	Wt (g)	n	Wt (g)	n	Wt (g)	n	Wt (g)	n	Wt (g)
Core	--	--	--	--	1	6.9	--	--	--	--
Flake	14	8.8*	1	1	50	18.1*	4	12.3	--	--
Shatter	1	0.6	1	0.3	28	37.2*	1	0.2	1	0.8
Totals	15	9.4*	2	1.3	79	62.2*	5	12.5	1	0.8

* 3 BRS flakes, 16 quartz flakes, and 1 quartz shatter weighted under 0.1 g and were not included in the weight.

5.2.1.3 Interpretation

The high percentage of quartz suggests this is a locally available lithic resource. The size of the flakes, up to about 6 cm in length, also reflects local procurement. Vein quartz was observed in a Precambrian outcrop that runs through the site and is most likely the source of at least some of the raw material. Beaver River Sandstone also seems to be an important lithic material at HfOf-4. Beaver River Sandstone is considered a non-local material throughout this project area. The nearest known source of high-quality Beaver River Sandstone is the Quarry of the Ancestors near Fort MacKay, about 268 km away following the Clearwater River and the Athabasca River (Saxberg 2007:13). That Beaver River Sandstone was found here and throughout the project area suggests some type of connection to the material source area near Fort MacKay. Whether finding Beaver River Sandstone here reflects trade with groups that had access to this lithic material, or reflect the seasonal rounds or territory of one group is difficult to assess. The presence of Beaver River Sandstone in significant quantities in archaeological sites from the Fort MacKay area to this site indicates that the Clearwater River and the Athabasca River, at least between these two points, must have been an important travel corridor.

Three archaeological sites were previously recorded in this area (Wilson 1979:22). The presence of four archaeological sites here is a good indication that this area was important to precontact people. A contemporary fishing camp here further indicates that the importance of this location continues to the present (Wilson 1979:22). The natural constriction of the Clearwater River where the bridge crosses Warner Rapids may have been an important fishing area, or possibly the natural lake-like pools between the rapids may have been rich in both fish resources and water fowl.

This area also has particular importance in terms of traditional transport routes. There are a series of portage trails marked on the National Topographic Survey map that link Wasekamio Lake on the Churchill River System to the Clearwater River (Figure 5.4, map sheet 74 C/15, Mackie Rapids). There is also ethnographic evidence of portaging between Wasekamio Lake and the Clearwater River in the 1940s (Millar 2009:23), which is before the Semchuck Trail (Highway 955) and the Warner Rapids bridge were built, ruling out the notion that these trails were a consequence of the building of the road and bridge. This may have been an important route between the Churchill River system and the Mackenzie River System from at least the late Historic period, if not for hundreds or thousands of years earlier.

It should also be noted that Wasekamio Lake most likely drained northward into the Clearwater River after deglaciation until about 5,000 BP (Fisher and Souch 1998). After this period, isostatic lifting heightened the area between this lake and Clearwater River causing the lake to then begin flowing into the Churchill River System (Fisher and Souch 1998). The changing flow of this lake likely had a significant effect on the land use of this area.



Figure 5.4. Portage trails from Wasekamio Lake to the Clearwater River near HfOf-4.

Several factors suggest that this may have been an important aggregation centre: the large size of the site, the relatively high percentage of non-local lithic materials, the seasonal availability of food resources as witnessed by the contemporary fishing camps located here, its traditional use as a portage and its strategic location between the Mackenzie and Churchill River Systems, and the presence of other sites in this immediate area.

If caribou or bison migrated to this area during precontact times, as suggested in section 2.5, HfOf-4 may have been an attractive area for regional bands aggregating in the spring after the northbound barren-ground caribou migration. Areas upriver from this site were previously used for aggregations by the Dené (Holland 2002:49, 53), further strengthening the possibility that this may have also been an aggregation area when caribou migrated to areas much further south than they did during the ethnographic and Historic periods. If not an aggregation centre, minimally, this site may have served as a base camp or a seasonal fishing camp during precontact times.

5.2.2 HfOh-1, Descharme River Confluence

5.2.2.1 Description

The Descharme River confluence is approximately 18.5 km downriver from the Warner Rapids Bridge (Figure 5.1). HfOh-1 is less than 500 m upstream from this confluence on the east side of the Descharme River. The site is about 50 m east of the river on a landform that is about 50 m wide (Figure 5.5). This landform tapers off to the north of the site, but continues south to the Clearwater River, then parallels it going east. There is a small Precambrian outcrop about 20 m south of the site. Vein quartz was observed in this outcrop. This area was chosen for survey because it was at a confluence of two major rivers.



Figure 5.5. Confluence of the Descharme River and Clearwater River. Looking north up the Descharme River.

Vegetation at this site consists of open Jack pine forest, reindeer moss, and sphagnum moss. Some juvenile spruce inhabits the forest floor in and around the site. Closer to the Descharme River, willow becomes more prominent and the landscape becomes much less well-drained and prone to flooding. A similar situation occurs in the area between the site and the Clearwater River.

5.2.2.2 Results

This site was found through subsurface testing. A series of negative tests were conducted along the edge of this landform next to the river. The first positive test hole was on a fairly well worn trail. This trail looked to have been a game trail, but may have been used by humans in the past. A total of 13 test holes were dug to determine the site and its boundaries. There were five positive tests and eight negative tests. One of the tests was enlarged to 50 x 50 x 50 cm, and the depths of the artifacts were noted when possible for the sake of understanding the site and its stratigraphy better. The soil profile, from top to bottom, consisted of about a 2-cm organic layer, followed by about 4 cm of dark gray sand, then about 12 cm of light gray sand, then orange sand to the bottom of the test about 50 cm below surface (bs). These layers seem to be the result of soil development processes. The soil here is best described as being a podzolic developed soil. Throughout our survey area, this site displayed the best example of soil

formation processes. The majority of artifacts collected from this test seem to have come from the transition zone between light gray sand to orange sand, which was approximately 15 to 20 cm bs. The maximum depth of artifacts in one of the other positive test holes was approximately 20 to 25 cm bs. The site was determined to be approximately 12 m in length and approximately 8 m in width.

A total of 114 lithic artifacts were found in the subsurface tests at this site (Table 5.2). Four of these artifacts have been identified as tools; two are endscrapers and two are retouched flakes. All of the tools were made from quartz. Two of the artifacts were FBR composed of a loose quartz conglomerate. One core made from Beaver River Sandstone was found. The remaining 107 lithic artifacts were debitage (flakes and shatter). One of the flakes, made from mudstone, appears to be blade-like (Figure 6.16). Two Beaver River Sandstone artifacts appeared to have been heat-treated based on surface reddening. The most common lithic material was quartz (n=108, 94% by piece count, 96% by weight), followed by Beaver River Sandstone (n=2, 2% by piece count and weight), conglomerate (n=2, 2% by piece count and weight), silicified mudstone (1% by piece count, less than 1% by weight), and quartzite (n=1, 1% by piece count and by weight). Fifteen quartz flakes and 6 quartz shatter were under 0.1 g and were not included in the weight.

Table 5.2. Lithic material by artifact type, HfOh-1

Artifact type	Lithic material									
	BRS		Conglomerate		Mudstone		Quartz		Quartzite	
	n	Wt (g)	n	Wt (g)	n	Wt (g)	n	Wt (g)	n	Wt (g)
Core	1	1.3	--	--	--	--	--	--	--	--
Flake	1	1.1	--	--	1	0.4	57	30.3*	1	0.7
FBR	--	--	2	2.1	--	--	--	--	--	--
Endscraper	--	--	--	--	--	--	2	18	--	--
Retouched Flake	--	--	--	--	--	--	2	8.5	--	--
Shatter	--	--	--	--	--	--	47	82.7*	--	--
Totals	2	2.4	2	2.1	1	0.4	108	139.5*	1	0.7

*15 quartz flakes and 6 quartz shatter weighed under 0.1 g and were not included in the weight.

5.2.2.3 Interpretation

Two interesting technologies were evident from the lithic debitage found at this site. One is heat treatment, as noted on two pieces of Beaver River Sandstone; the other is a possible

microblade-like technology. The microblade-like flake here is of some interest in that it may suggest a cultural affiliation with NWMt or Pre-Dorset archaeological cultures (see section 3.4.1). The BRS found here suggests a connection with the Quarry of the Ancestors in northeastern Alberta, as it did at HfOf-4 (see section 4.2.1).

The depth that the artifacts were found is also of interest. The majority were found between 10 cm and 20 cm in depth, with the maximum depth being between 20 cm and 25 cm. These finds are relatively deep when compared to the other sites that were found during this survey, making me question its lack of stratification. Although stratification was not seen at this site, it is possible that this site was in a depositional environment at one time, and that closer analysis at this site may reveal stratification. Alternatively, the relative depth of this site may indicate a disturbed context due to pedoturbation, which can be problematic in sandy matrixes (Leigh 2001:271-272). Refitting studies have shown that a vertical dispersion of artifacts of as much as 40 cm may occur in single occupation sites in boreal forest sites (LeBlanc and Ives 1982:63).

This site is on a landform about 50 m from the Descharme River placing it further away from the river than would be expected for a summer camping location. There is currently a landform that could have offered a suitable location for a campsite that was lower and closer to the river. The benefits of a site closer to the water in the summer include easier access to water, as well as providing increased protection from mosquitoes and flies that prefer the less breezy environment further into the treed area. During the winter, the preferable setting for a camp would be further into the treed area where it is less open and exposure to the wind would be limited (LeBlanc and Ives 1983:85). This site's distance from the water suggests that it was used during the colder periods of the year, late fall, winter, or early spring. Conversely, the location of this site may suggest that it was used at a time when the river was closer to the site, a scenario which implies that the site is of some antiquity.

The diversity of lithic materials and the relatively large quantity of lithic artifacts at this location suggest that this may have been some type of base camp that was used for a few days or longer and not merely an overnight camp. The presence of FBR also supports this interpretation. The geographic location, at the confluence of two major navigable rivers, suggests that this area is important.

5.2.3 HfOh-2, Descharme River

5.2.3.1 Description

This site is located approximately 2 km up the Descharme River from its confluence with the Clearwater River (Figure 5.1). The site is on the south side of the river. At this point in the river, the Descharme River widens out to about 475 m and looks like it is beginning to form an anastomosing reach. The landform that the site is on drops sharply into the river, about two meters north of the site (Figure 5.6). The site is elevated about 7 m above the water level of the river. The horizontal distance from the river is no more than 10 m. An old river channel where the Descharme once ran is about 15 m to the east of the site. There is a fairly well used ATV trail that runs parallel to the river and through the site.



Figure 5.6 Anastomosing reach in the Descharme River at HfOh-2. View to the north.

The vegetation here is open Jack pine forest with reindeer lichen covering the forest floor. Blueberries are also quite abundant. Some grass and birch saplings grow on the semi-exposed bank near the river. Cattails inhabit the edge of the river in many spots and, judging by the many islands in this braided alluvial environment, the river channels are likely quite shallow. A number of waterfowl were seen in this area of the river.

5.2.3.2 Results and interpretation

The discovery of this site was a result of systematic subsurface testing every 10 to 15 m along the Descharme River. There were only two positive subsurface tests at this site, both of them along the river. The site measures 10 m in length and 5 m in width. Eight negative test holes were dug to determine the site boundaries. Four were dug directly south of both positive tests, two were dug directly east, and two were dug directly west. The soil profile, from top to bottom, consisted of a approximately 2-cm organic layer, followed by about 5 cm of dark grey sand, then orange sand to the bottom of the shovel test, about 40 cm bs. Exposures along the river bank on the north of the site were surveyed for artifacts, but none were found.

This was not an extremely productive site, as only five pieces of debitage were found (Table 5.3). One of these artifacts was a retouched flake. All of the lithic artifacts were made

Table 5.3. Lithic material by artifact type, HfOh-2

Artifact type	Lithic material	
	Quartz	
	n	Wt (g)
Flake	4	74.1
Retouched flake	1	1
Totals	5	75.1

from quartz. One bone fragment was found at a depth of approximately 10 cm bs. Unfortunately, there was no culturally positive material found in the test with the bone that would more strongly suggest that it was cultural. A preliminary examination of the bone did not find any cut marks; therefore, it is unclear if the bone is associated with the archaeological site. There was also a slip-top can found adjacent to the site on the surface. Although this artifact looks old, it is not temporally diagnostic and may have been left there quite recently. This location would provide a good place to spot and perhaps hunt waterfowl. It would also provide a

good view of any land mammals such as deer that may use the abandoned river channel to access the current river. This site was likely a small hunting camp during the Precontact period, as well as at some time during the contemporary era. The small quantity of artifacts and small size of this site suggest that it is of low archaeological significance. It is possible that most of the site has been lost to bank erosion.

5.2.4 HeOh-1

5.2.4.1 Description

HeOh-1 is approximately 25 km downstream from the Warner Rapids Bridge on the northwest side of the river (Figure 5.1). Conical tent poles erected on the banks of the river first drew our attention to this area (Figure 5.7). The site was found in an area directly adjacent to the



Figure 5.7. Erect conical tent poles on a knoll adjacent to HeOh-1.

knoll where the conical tent poles were found. It sits on a landform that is elevated above the river about 7 to 10 m. The morphology of the terrain surrounding the site is comprised of undulating stabilized sand dunes. It is likely that this geomorphology is a remnant of a relatively dry and windy post glacial environment approximately 10,000 BP (section 2.9.2; Fisher 1996; McLeod and MacDonald 1997:878); however, it also may simply be a case of glaciofluvial sand deposited after the 9,900 BP overflow from Glacial Lake Agassiz which was slightly reworked by the wind before vegetation had an opportunity to stabilize it. The site itself lies in a lower area between two small knolls, and is about 10 m horizontally from the river.

The vegetation here is quite diverse. The landform that the site sits on consists of open Jack pine forest. Reindeer lichen, kinnikinnick, and blueberries dominate the forest floor. There are sparse tufts of grasses, as well as some clusters of rose bushes, near the edge of the landform. River alder and willow grow in the riparian area near the river's edge. There were also some red-osier dogwood shrubs closer to the water's edge and relatively large white birch trees grow on the river bank higher up and closer to the edge of the landform. There were no rock outcrops visible in the immediate area.

5.2.4.2 Results

This site was designated from only one positive subsurface shovel test. The site's boundaries were determined by two negative shovel tests in each direction north, east, and west of the positive shovel test. The proximity of the landform edge only permitted one test south of the positive test. The soil profile, from top to bottom, consisted of a roughly 2- cm organic layer, followed by approximately 2 cm of dark gray sand, then about 40 cm of light gray sand, then about 2 cm of orange sand to the bottom of the test. Exposures under the landform below the site were checked, but no cultural materials were found. Based on negative shovel tests, the site was determined to be no larger than 5 x 5 m in size.

A total of 12 lithic artifacts were found in one positive test (Table 5.4). Eleven of these were made from a grayish chert material. This material looks to be of highly knappable quality. At least one of these pieces of debitage had the original cortex on it. Two pieces of this chert are refits and look to be a result of burin technology. These two pieces will be further discussed in chapter six, section 6.2.3. There was one quartz flake also found in this positive test hole. Chert was the dominant lithic material (n=11, 92% by piece count, 83% by weight), followed by quartz

(n=1, 8% by piece count, 17% by weight). The predominance of chert in this assemblage deviates from the typical predominance of quartz in the majority of sites located in the course of this project.

Table 5.4. Lithic material by artifact type, HfOh-1

Artifact type	Lithic material			
	Chert		Quartz	
	n	Wt (g)	n	Wt (g)
Flake	7	6.9	1	2.6
Core	1	2.9	--	--
Burin	2	2.2	--	--
Shatter	1	0.4	--	--
Totals	11	12.4	1	2.6

5.2.4.3 Interpretation

Of particular interest at this site were the two pieces of chert that could be refitted. Together, these pieces suggest burin technology (see chapter six, section 6.2.3). The small size of the site suggests that this may have been a small precontact hunting camp. That the assemblage from this site is dominated by chert in an otherwise quartz dominated area suggests that this was a single use site.

5.2.5 Gould Rapids

5.2.5.1 Description

Gould Rapids is about 29.5 km downstream from the Warner Rapids Bridge (Figure 5.1). The associated portage trail is slightly longer than 1 km and is on the west side of the river. The portage trail passes through a large portion of dissected Precambrian Shield outcropping, which would not be a good camping location; conversely, however, it also passes through areas which are good camping locations now and therefore are also of high archaeological potential. One suitable camping location is at the top of the portage trail, another one is at the bottom, and yet another is at a central point on the trail. The vegetation here is typical open Jack pine forest with a reindeer lichen floor. There is also an abundance of blueberries. This section of river is only

navigable by experienced white-water canoers, and portage is highly recommended. A previous inspection of satellite imagery, contour maps, and written canoe trip guides for the area (Archer 2003:113-130; Marchildon and Robinson 2002:67-104) suggested that this portage area would have low to moderate archaeological potential; however, after an on-site inspection of the area, it was deemed to be of high potential because of its habitable sections, and its abundance of berries, and because it was more than likely a mandatory portage for early people using the river for travel.

5.2.5.2 Results

There were no archaeological sites found along this portage. The three prime habitable areas were subsurface surveyed and a total of 60 subsurface tests were dug, but no cultural materials were found. Exposed areas along the trail were also surficially surveyed with negative results. The negative results throughout this portage area were unexpected. A representative soil profile, from top to bottom, consisted of a approximately 2-cm organic layer, followed by about 14 cm of light gray sand, then orange sand to the bottom of the test, at about 50 cm bs. One feature of special interest, although not deemed to be an archaeological feature, was a small rock structure constructed around a small cavity in a rock outcrop (Figure 5.8). Besides the obvious



Figure 5.8. Rock structure around a small cavity in a rock outcrop along Gould Rapids.

placement of the rocks by people, there was no evidence that this construction was historic in nature. One suggestion is that this may be a cavity that was built to facilitate the trapping of small fur-bearing animals.

5.2.5.3 Interpretation

The importance of this area lies not in finding large amounts of cultural materials, but in hypothesizing why there were none found. The entire project area was found to contain a relatively high density of archaeological resources, and the lack of sites along this portage route leads to speculation about cultural causation. Avoidance of certain areas because of particular cultural beliefs has previously been documented (Jones 1981:72; Lipsett 1990:75, 124-126). It is also possible that this area had sacred significance that did not leave archaeological evidence. Another possibility is that it may have been part of a group boundary where either group would not enter this area out of fear of retaliation. Alternatively, the absence of sites could indicate more recent geomorphological processes, such as flooding or changing river courses removing archaeological evidence.

5.2.6 HeOh-2, Smoothrock Portage

5.2.6.1 Description

This site is at the bottom of Smoothrock portage, about 33km downstream from the Warner Rapids Bridge (Figure 5.1). The site is on a small 40 x 20 m wide landform overlooking the bottom of Smoothrock Rapids, immediately past Smoothrock Falls (Figure 5.9). The river does not pool at the bottom of these falls, but continues as a set of extreme rapids. The flow of the rapids slows to navigable by the time it reaches the bottom of our site. There is a larger landform above the site that is the main area of a contemporary campsite used by canoers. There are two contemporary hearths on this higher landform. The lower archaeologically occupied landform is also used as a part of this campsite. There are Precambrian shield outcrops both below and above this site. Much of the portage trail that leads to this campsite consists of dissected Precambrian outcrop. There is a sandy slope dipping down to the river east of the site. This slope ends with a Precambrian outcrop near the river's edge, about 35 m away.



Figure 5.9. HeOh-2. View to the north from the river with Tim standing on the edge of the site.

Much of the portage and surrounding area consists of dissected shield outcroppings. There is also an abandoned waterfall on the other side of the river. Some of the outcrops take the form of overhangs, cliff faces, and quasi-caves (Figure 5.10). This area is a visually striking and unique area. This is especially true of the abandoned falls close to the top of the portage on the other side of the river (Figure 5.11). Natural showers, bathing pools and highly polished rock are unique features of the abandoned falls.

At least one of the guides consulted before this fieldwork mentioned that this area was rumored to contain rock art. Although we spent at least a couple of hours surveying the area for this type of feature, none was found. The topography of this area is quite complex and covers a large amount of space; to sufficiently survey this area for rock art would have taken much more time than we had during this survey.



Figure 5.10. Typical rock outcroppings surrounding Smoothrock Falls



Figure 5.11. Tim in front of the abandoned waterfall at Smoothrock Falls.

The vegetation at this site consists of open Jack pine forest with a predominantly reindeer lichen and cranberry floor. There is some poplar to the north of the site on the portage trail. Leafy arnica was spotted on the higher landform close to the Precambrian outcrop. Some grasses and goldenrod inhabit the south-facing slope toward the river.

5.2.5.2 Results

At this site, only one test hole was positive. This positive test was expanded to a 50 x 50 cm test in an attempt to further define the site. The soil profile of this test was, from top to bottom, an approximately 2-to-4-cm organic layer, followed by approximately 10 to 15 cm of light gray sand, followed by orange sand to the bottom of the test, at about 40 cm bs. One of the concerns with this site was that it may have been disturbed by previous campers, but analysis of the soil profile suggests that there was no significant disturbance of the soil. Three other tests

were conducted on the lower landform, and three tests were dug on the higher landform. All of these were negative. The site was defined as being no larger than 5 m in size.

Although there was only one positive shovel test at this site, two tools were found (Table 5.5). One tool was a quartzite preform and the other was a bifacially worked quartz flake. There were 13 other pieces of quartz debitage found in this shovel test. Preliminary analysis of the preform (personal observation) and the bifacially worked flake tool (Matthew Stewart, personal communication 2008) indicates that there is use-wear on their edges. The most common lithic material was quartz (n=14, 93% by count, 66% by weight), followed by quartzite (n=1, 7 % by count, 34% by weight). Three of the quartz artifacts had cortex on them. This site shows a high reliance on locally procured materials, and no Beaver River Sandstone was found. Four quartz flakes weighed under 0.1 g and were not included in the weight.

Table 5.5. Lithic material by artifact type, HeOh-2

Artifact type	Lithic material			
	Quartz		Quartzite	
	n	Wt (g)	n	Wt
Flake	12	15.6*	--	--
Retouched flake	1	4.4	--	--
Shatter	1	0.5	--	--
Preform	--	--	1	10.6
Totals	14	20.5*	1	10.6

*4 quartz flakes weighed under 0.1 g and were not included in the weight.

5.2.6.3 Interpretation

There is a set of falls at this point of the river which necessitates a portage. The small size of the landform here would not allow for a large group of campers. That there were two tools found here is archaeologically important considering the small overall quantity of tools that were found throughout this project.

5.2.7 HeOh-3, Smoothrock Falls

5.2.7.1 Description

HeOh-3 is located about 300 m downstream from Smoothrock Falls on the north side of the river (Figure 5.1). It is located on a landform that juts out slightly into the Clearwater River (Figure 5.12). This site is about 33 km from the Warner Rapids Bridge. The vegetation here is typical open Jack pine forest with a reindeer lichen, blueberry and cranberry floor.



Figure 5.12. HeOh-3, Smoothrock Falls.

5.2.7.2 Results

This location was not designated as a site until lithic specimens that were brought back to the laboratory at the University of Saskatchewan were deemed cultural. The site was defined by two positive test holes and three negative test holes that were placed on the landform that the site

is on and an adjacent landform to the west. The soil profile was not recorded for this location. The site is 20 m in length and 5 m in depth.

Ten lithic artifacts and 39 unidentifiable bone fragments were found here (Table 5.6). The lithic artifacts were found in one test hole, while the bone was found in a separate test about 15 m northeast of the first test. While the debitage is definitely cultural, the bone may not be. Examination for cut marks identified none. There is no evidence, except for their close proximity, that the bones are indeed cultural or associated with the lithic debitage. By piece count, both quartz and quartzite were represented equally (n=5, 50% by piece count for both); however, the quartz debitage was represented slightly higher by weight (51% by weight for the quartz, while quartzite was 49% by weight).

Table 5.6. Lithic material by artifact type, HeOh-3

Artifact type	Lithic material			
	Quartz		Quartzite	
	n	Wt (g)	n	Wt (g)
Flake	2	0.5	5	4
Shatter	3	3.7		
Totals	5	4.2	5	4

5.2.7.3 Interpretation

This site is on a very well-situated landform that overlooks the rapids at the bottom of Smoothrock Falls. The small amount of debitage that was found there and the possibly associated bone suggest that this was most likely a small hunting camp. The proximity to the portage suggests that it may have been an overnight stop associated with the portage. It is interesting that bone was preserved at this site, given boreal forest soil acidity. If this bone is cultural, the possibility of being able to find more in a controlled excavation may increase the significance of this site.

5.2.8 Undesignated heritage site

5.2.8.1 Description

This site is located on a sandy surface that is almost completely surrounded by Precambrian outcrop. This outcrop forms a point in the Clearwater River. A low swampy area

surrounds an approximate 100 x 20 m landform. A small stream situated in the swampy terrain runs into the Clearwater River on the west side of the site. The north side of the site had a unique Precambrian shield outcrops with deep crevices in them. The bottoms of the crevices were a part of the surrounding swamp. There had been a fairly recent forest fire in this location, and much of the ground was exposed. The site is approximately 33 km downstream from the Warner Rapids Bridge on the north side of the river.

This site has not been designated as an archaeological site. There is no doubt that it has heritage value, but no conclusive evidence has been found that it dates to before World War II, which is the arbitrary temporal boundary used to designate historical sites in Saskatchewan. Anything more recent than this is not given a Borden number and is not protected.



Figure 5.13. Undesignated heritage site. View to the south.

5.2.8.2 Results

Because a fire had recently left much of the ground exposed, the main method used here was surficial survey. There were no artifacts collected at this location. Artifacts that were observed were twisted wire, a few unidentifiable small and large metal fragments, pieces of a stove pipe, and a hand-cut and axe-notched log end that may have been part of a building structure or possibly a rail fence (Figure 5.14). The surface of the surrounding landform was explored for further artifacts, depressions or any other evidence of habitation, but none was found. Two test pits in the area also failed to provide any artifacts.



Figure 5.14. Hand-cut and notched log observed at undesignated heritage site.

5.2.8.3 Interpretation

The landform that these artifacts were found on was very small and uneven, so it is hard to imagine that there was once a cabin at this location. It is most likely that this site was used as a small hunting or trapping camp by historic or contemporary people.

5.2.9 HeOi-1, Skull Canyon

5.2.9.1 Description

HeOi-1 is located about 40 km downriver from the Warner Rapids Bridge (Figure 5.1). It is about 330 m downriver from the bottom of the Skull Canyon portage, on the north side of the river. There is a large contemporary campsite and traditional use area located here (Figure 5.15). There are no ATV trails to this site; the only access is by boat or canoe. There are at least a few campsites located in the immediate area, but this campsite is by far superior in size and accessibility in comparison to the others. The size of the site is approximately 60 m x 20 m. This location also has a good view of the twin waterfalls and “flower pot” island at the end of Skull Canyon (Figure 5.16).



Figure 5.15. HeOi-1, Skull Canyon campsite. View to the west.



Figure 5.16. The “flower pot” island at the end of Skull Canyon.

The site is located on a landform with one Precambrian outcrop to the south of the site as well as an outcrop to the west. There is a river cutbank with a sand and rock exposure below this landform. The river is eroding part of this cutbank, but this erosion seems minimal. A trail leading from the canoe launch to the campsite is actively eroding into the landform where the site sits. This erosion is a threat to the site. There is also a trail to a clearing east of the site. This looks like it is predominantly a natural clearing, but there are also chainsaw cut stumps on its outer periphery. This clearing may have been, or is, some sort of traditional use area or contemporary gathering area. There were no depressions noted in this area. What was interpreted as a rabbit snare run that was constructed by sticking branches in the ground was observed in the woods adjacent to this clearing (Figure 5.17). There was no snare wire or cordage of any type observed in the area. Snare runs constructed in a similar manner have been



Figure 5.17. Rabbit snare run found close to HeOi-1, Skull Canyon campsite.

noted in Chipewyan ethnographic literature (Jarvenpa and Brumbach 2006:75). The archaeological site itself displays evidence of extensive traditional use, such as what appears to be the remains of a fish drying rack (Figure 5.18), two recently dug pit structures and log features. The vegetation of the site is open Jack pine forest. There are abundant blueberries at this location as well as cranberries.



Figure 5.18. Collapsed drying rack at HeOi-1, Skull Canyon Campsite.

5.2.9.2 Results

Two pieces of Beaver River Sandstone found in an exposure under our campsite were the first archaeological evidence for this site. We began to conduct subsurface tests in a westward line approximately every 10 m until we came to the Precambrian outcrop on the west end of the campsite. We also tested north along the landform beside the river. Further tests were conducted in a north/south transect about 25 m into the interior of the campsite. Then exposures along the cutbank were surficially surveyed. In all, there were 7 positive subsurface tests, two surficial find areas located on the cutbank, and 13 negative tests that defined the perimeter of this site. An 80-cm-deep test pit was dug to observe the site's soil profile. The site profile, from top to bottom, consisted of a roughly 2-cm organic layer, followed by about 5 cm of light gray sand, about 38 cm of orange sand, 20 cm of lighter orange sand, then a level that gradually shifted to a lighter gray to the bottom of the test at about 80 cm bs. Eight negative tests were dug in the clearing east of the site. It was determined that the site area was 60 m in length and 20 m in width.

A total of 22 lithic artifacts and 125 bone fragments were found at this site (Table 5.7). The bone fragments are too small to identify, but look to be from one or more small mammals.

Table 5.7. Lithic material by artifact type, HeOi-1

Artifact type	Lithic material							
	BRS		Chert		Quartz		Quartzite	
	n	Wt (g)	n	Wt (g)	n	Wt (g)	n	Wt (g)
Flake	4	5.9*	2	1.9	9	3.4*	1	0.6
Core	1	5.9	2	16.5	--	--	--	--
Shatter	--	--	2	7.2	3	19.4	--	--
Totals	5	11.8*	6	25.6	12	22.8*	1	0.6

*1 BRS flake and 2 quartz flakes weighed under 0.1 g and were not included in the weight.

Cut marks were not evident. There were no lithic tools found; however, two chert and one Beaver River Sandstone core fragments were found. One of the chert cores has microblade-like scarring on it. The other chert piece that was interpreted as a core was very vuggy and angular, and its designation as a core, or even as cultural, is questionable. One of the quartz flakes, as well as one of the chert flakes displayed cortex. The two most common lithic materials were

quartz (n=12, 50% by piece count, 38% by weight) and chert (n=6, 25% by piece count, 42% by weight), followed by Beaver River Sandstone (n=5, 21% by count, 19% by weight), and quartzite (n=1, 4% by count, 1% by weight). One Beaver River Sandstone flake and 2 quartz flakes weighed under 0.1 g and were not included in the weight.

5.2.9.3 Interpretation

This site is an important contemporary traditional use area and/or possible aggregation centre. Supporting this site's use as an aggregation centre during precontact times is the size of this site and the diversity of lithic materials collected at this site, including Beaver River Sandstone. The use of aggregation centres over large periods of time has been previously suggested by other researchers (Meyer et al. 1992:220).

The preservation of archaeological bone in the northern boreal is rare (Ives 1993:8). Because this site has likely been used multiple times from at least the late Precontact period to contemporary times, it is also possible that the bone and may not be associated with the chipped rock assemblage may be quite recent.

5.2.10 HeOi-2, Skull Canyon

5.2.10.1 Description

HeOi-2 is southeast of HeOi-1, across the large pool at the bottom of Skull Canyon (Figure 5.1). This site is approximately 40 km downriver from the Warner Rapids Bridge, on the south side of the river and about 130 m south of Skull Canyon. It is on top of a fairly high cliff that forms a small point overlooking the pool (Figure 5.19). The height of the cliff is approximately 20 to 30 m. Access to the site is from a small, steep trail along one of the slump blocks on the cliff face on the north side of the site. There is also access to the river about 100 m east of the site. Here a trail leads to a large, concealed pool that is directly in front of Skull Canyon. Although possible to access the site from here, one would first have to paddle up a set of small rapids. Both accesses to the site are currently difficult.

Vegetation here is typical for the area, open Jack pine forest with reindeer lichen, cranberry and blueberry on the forest floor. There are some poplar trees on the edge of the river;

however, their growth is rather sparse because of the steepness of the cliff walls and a lack of soil.



Figure 5.19. The cliff below HeOi-2, Skull Canyon.

5.2.10.2 Results

The site was defined by subsurface testing. There was only one positive shovel test here. Two negative shovel tests were dug north of the positive test and two were dug east of the positive test. The site was determined to be no larger than 5 x 5 m in size. A hearth was found on the surface adjacent to the site (Figure 5.20). The hearth and the cultural materials found in the subsurface test are most likely not from the same cultural event; most likely this hearth is from the modern era. Negative tests on the east side of the site were within 2 m of the hearth. The soil profile was not recorded at this site. One Beaver River Sandstone flake weighed under 0.1 g and was not included in the artifact weight.



Figure 5.20. Hearth beside HeOi-2, Skull Canyon. View to the north (trowel points north).

Only three lithic flakes were discovered here (Table 5.8). Two were made from quartz (67% by count, more than 99% by weight), while the other was made from Beaver River Sandstone (33% by count, less than 1% by weight). About 40 m northeast of the site, what looks to be a small frame (Figure 5.21), a blaze cut into a pine, and a pine rail nailed into two trees provided evidence of traditional use of this site by contemporary First Nations people. The interior of the frame construction was overgrown with reindeer lichen, and there was no visible rock or FBR in the interior.

Table 5.8. Lithic material by artifact type, HeOi-2

Artifact type	Lithic material			
	BRS		Quartz	
	n	Wt (g)	n	Wt (g)
Flake	1	<.1*	2	2.4
Totals	1	<.1*	2	2.4

*1 BRS flake weighed under 0.1 g and was not included in the weight.



Figure 5.21. Tim stands beside the frame close to HeOi-2. Note its small size.

5.2.10.3 Interpretation

The materials discovered here do not suggest that the site is very large, or likely to yield significant materials through further excavation. The site's small extent and currently difficult access suggests that this is not a base camp. It is possible that this may have been a small hunting camp, but it is also possible that this site was used for sacred purposes or ritual.

5.2.11 HeOi-7, Simonson Rapids

5.2.11.1 Description

HeOi-7 is located approximately 45.5 km downriver from the Warner Rapid Bridge on the west side of the river (Figure 5.1). The site is on a landform with a point formed by a Precambrian outcrop (Figure 5.22). The river is about 15 m from this site. The vegetation here is typical for the area: open Jack pine forest with a reindeer lichen, blueberry and cranberry floor.



Figure 5.22. HeOi-7 from the river. View to the northwest.

5.2.11.2 Results

This site was defined through subsurface testing. There were only two positive tests at this site; five negative tests delimited the site's boundaries. The site is 5 m in width and 10 m in length. The soil profile, from top to bottom, consisted of a roughly 5-cm-deep moss layer, followed by about 4 cm of white sand, then orange sand to the bottom of the test, at about 50 cm bs. Although there were only two positive tests at this site, 251 lithic artifacts were found (Table 5.9). One of these artifacts was a core fragment, and two were retouched flakes. The only lithic material at this site was quartz ($n=251$). A unique aspect of this material is that the majority of the artifacts ($n=220$, 88% by count) were quite transparent, with many pieces being almost glass-like. In fact, one of the first questions when we discovered this site was if the artifacts were indeed glass; however, some of the pieces showed a transition from being quite translucent to almost opaque suggesting that it was indeed quartz. Another important aspect of the debitage found at this site is that much of it ($n=49$, 20% by count) is small, weighing under 0.1 g. Unfortunately, the balances that were available during analysis were not able to weigh these small pieces. Because of this, a large part of this assemblage is not represented by weight.

Table 5.9. Lithic material by artifact type, HeOi-7

Artifact type	Lithic material	
	Quartz	
	n	Wt (g)
Core	1	3.8
Flake	188*	58.2
Retouched Flake	2	0.8
Shatter	60*	41.5
Total	251*	104.3

*44 flakes and 5 pieces of shatter weighed under 0.1 g and are not included in the weight.

5.2.11.3 Interpretation

This site is located between 5 and 10 m from a Precambrian outcrop (Figure 5.23). It was initially suspected that this outcrop may have been the raw material source for the debitage found here; however, the debitage was quite small and thin, which demonstrates an economizing behavior uncharacteristic of this type of procurement site (Beck et al. 2002:494-495, 498; Newman 1994:495, 499); however, there are exceptions (Whitaker et al. 2008:1107). A portion of the outcropping was examined for evidence of procurement, but none was found. Mosses covered most of the outcrop inhibiting easy inspection, and admittedly, we may have missed some evidence of procurement.



Figure 5.23. Moss covered outcrop on the east side of HeOi-7.

This is most likely a single-use site based on two lines of evidence. The first is that the material that was discovered here is very homogenous. The second is the very small area in which all the debitage was found. It is most likely that a single flintknapper shaped a tool or tools from a previously reduced biface or core, or perhaps resharpened or reshaped an existing tool. Although the site is not large, single-use sites such as this that produce large amounts of debitage can be valuable, reflecting the behavior of a single person in the act of tool manufacture. So far, none of the debitage can be refitted, but it is possible that a more complete sample of the debitage could yield refit pieces. Refit pieces could reveal the sequence of lithic reduction, and the decisions that the ancient knapper made during the manufacture of a tool.

5.2.12 HeOi-3, McLean River confluence

5.2.12.1 Description

HeOi-3 is about 52 km downstream from the Warner Rapids Bridge, across from the confluence of the McLean River and near the top of Contact Rapids and its portage and at the base of Simonson Rapids (Figure 5.1). The site is on top of an actively eroding cutbank on the north side of the river (Figure 5.24). The river forms a relatively large pool at this location. There is considerable contemporary human activity in this area. On the opposite side of the river, there is an ATV trail that follows the west side of the McLean River, originating from the Clearwater Dené Reservation about 24 km south and ending at the confluence of the McLean and Clearwater Rivers. There is a camping/picnic area at the end of this trail at the confluence that appears to be popular with the local population (see section 5.2.14). There is an ephemeral stream in an oversized valley separating HeOi-3 from HeOi-8 (see section 5.2.13). This valley is overgrown with a fairly dense stand of river alder. There is also a trail marked on the National Topographical Survey map crossing the river and continuing north of the river (Figure 5.25; NTS 74 C/11). I tried to re-locate this trail to no avail. It may not be in current use and may be overgrown. There was not very much time spent surveying this area, so it may have been missed. Much of the vegetation here is typical for the area: open Jack pine forest with a reindeer lichen, blueberry and cranberry floor.



Figure 5.24. HeOi-3, McLean River confluence. View to the south with the top of Contact Rapids in the distance.

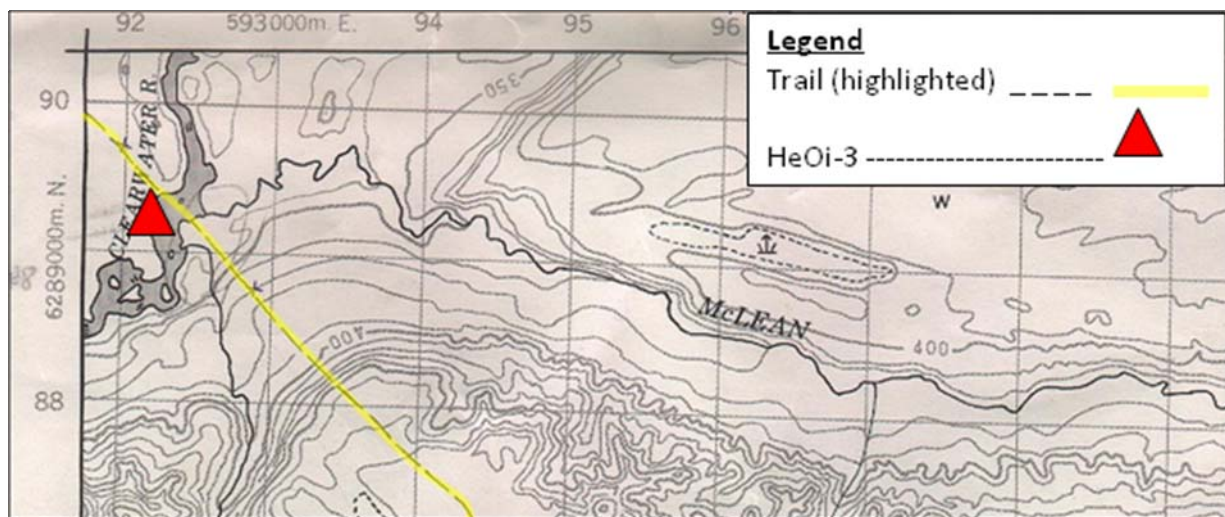


Figure 5.25. HeOi-3, NTS map showing site and overland trail crossing the Clearwater River.

5.2.12.2 Results

This site was defined through subsurface testing, as well as finds on the exposed cutbank below the site. This is a large site that required many shovel tests to determine its size. There were five positive shovel tests along the river and a total of 16 negative tests. All of the positive tests were within 5 m of the edge of the landform. A representative soil profile, from top to bottom, consisted of a roughly 5-cm organic layer, followed by about 21 cm of gray sand, then about 22 cm of orange sand to the bottom of the test at about 48 cm. The site spans the entire length of the landform and is approximately 120 m long and 5 m wide.

This site yielded 43 lithic artifacts (Table 5.10). There was one tool found, a broken sidescraper made from a grayish chert. We also found one quartz core that looked like it was bifacially reduced to produce flakes. Two of the BRS artifacts displayed reddening characteristics of heat treatment. There were also two pieces of FBR of sandstone and two unidentifiable pieces of calcined bone. The most common lithic material was quartz (n=18, 40% by count, 77% by weight), followed by Beaver River Sandstone (n=17, 38% by count, 9% by weight), chert (n=7, 16% by count, 12% by weight), sandstone (n=2, 4% by count, 1% by weight), and mudstone (n=1, 2% by count, 1% by weight). One of the chert flakes showed cortex. Five of the Beaver River Sandstone flakes, 2 of the chert flakes, and 2 of the quartz flakes weighed under 0.1g and were not included in the weight.

Table 5.10. Lithic material by artifact type, HeOi-3

Artifact type	Lithic material									
	BRS		Chert		Mudstone		Quartz		Sandstone	
	n	Wt (g)	n	Wt (g)	n	Wt (g)	n	Wt (g)	n	Wt (g)
Flake	17	4.8*	5	3.5*	1	0.5	12	14.4*	--	--
Shatter	--	--	1	0.3	--	--	5	23	--	--
Sidescraper	--	--	1	3.1	--	--	--	--	--	--
Core	--	--	--	--	--	--	1	5.3	--	--
FBR	--	--	--	--	--	--	--	--	2	0.5
Totals	17	4.8*	7	6.9*	1	0.5	18	42.7*	2	0.5

*5 BRS, 2 quartz and 2 chert flakes weighed under 0.1 g and are not included in this weight.

5.2.12.3 Interpretation

It is possible that this may be an aggregation centre, because it shares at least some of the main factors characteristic of other aggregation centres. This is a large site, being over 100 m long, and the landform on which it is located offers plenty of area for camping. HeOi-3's location at a portage, a major river confluence, and a possible river crossing puts it at a transportation crossroad. From its confluence with the Athabasca River to the bottom of Contact Rapids, the Clearwater River is characterized by relatively slow moving water (Parks Branch 1986:5). This would enable fairly easy up river travel from the Athabasca River to the west. The McLean River or its valley, which intersects this area, would have facilitated travel to and from the south. The large pool at the confluence of the McLean River likely offers a productive fishery, especially during spawning season. The cultural artifacts are diverse with four different

lithic materials present. There is a significant proportion of non-local lithic material, Beaver River Sandstone, found here. The higher occurrence of non-local lithic material is suggestive of more non-local influence and may further suggest that this was a gathering area of sorts (Sanger 1996:523).

5.2.13 HeOi-8, McLean River confluence

5.2.13.1 Description

HeOi-8 is directly north of HeOi-3 (Figure 5.1). These two sites are separated by a small gully with an underfit ephemeral stream running through it. The site sits on top of a landform that is about 5 m in height, jutting out into a point into the Clearwater River (Figure 5.26). This point is directly across from the large pool formed where the McLean River runs into the Clearwater River. The site offers a good vantage point over the pool, as well as the confluence of the McLean River and Clearwater River. The vegetation here is typical open Jack pine forest, with a reindeer lichen, blueberry and cranberry floor. The vegetation in the creek valley between HeOi-8 and HeOi-3 is dense river alder, with a floor that is predominantly covered with sphagnum moss.



Figure 5.26. Fire hearth at HeOi-8. Note the bone flesher to the left of the hearth. The flesher had been picked up and put back in place; as a result, this photo does not properly show its embedded depth.

5.2.13.2 Results and Interpretation

This site was determined solely on the surficial find of a bone flesher found beside a fire hearth. There was only limited time to survey this site, and only exposures in and around the fire hearth were surficially surveyed with no subsurface testing conducted. The bone flesher (Figure 5.27) was semi-buried in the upper organic soil level of the site when it was first found. The tool itself has not been dated, but judging by the lichen that covered exposed areas of it, as well as its partially buried position, it is likely to have been used during the early to mid-twentieth century. Preliminary observations of the tool noted that it was decorated on the shaft with geometric lines.

There has been recent use of the hearth that the bone tool was found alongside. A large mammal bone that was likely put into the campfire within the last ten years was also visible. It is probable that this site has been used repeatedly since at least the Historic period by First Nations people as a hunting camp. That a bone flesher was found here, as well as the more recently deposited mammal bone, suggests that the site may have been a small base camp, where hides and meat were prepared for transport to a more major camp.



Figure 5.27. Longbone tool found at HeOi-8. Note the diagonal cut marks/decoration along the length of the shaft.

5.2.14 HeOi-6, McLean River confluence

5.2.14.1 Description

HeOi-6 is about 52 km downstream from the Warner Rapids Bridge, on the east side of the Clearwater River and the south side of the McLean River confluence (Figure 5.1). This site is across a large pool in the river from HeOi-3. The morphology of the landscape at this site is quite complex; the site occupies at least 3 different landforms. Most of the landforms here were likely formed by flooding or downcutting by the McLean River. Precambrian rock outcrops occur near the northwest end of this site at its access point from the Clearwater River. Therefore, it contains fairly large dissected pieces of Precambrian granite where it flows past this site. The McLean River is not navigable at this point, but it may be navigable further upstream. This is also a contemporary camping/picnic area. An ATV trail from the Clearwater River Dené Nation leads to this site (Figure 5.28). ATV trails and contemporary fire hearths dot and crisscross this site.

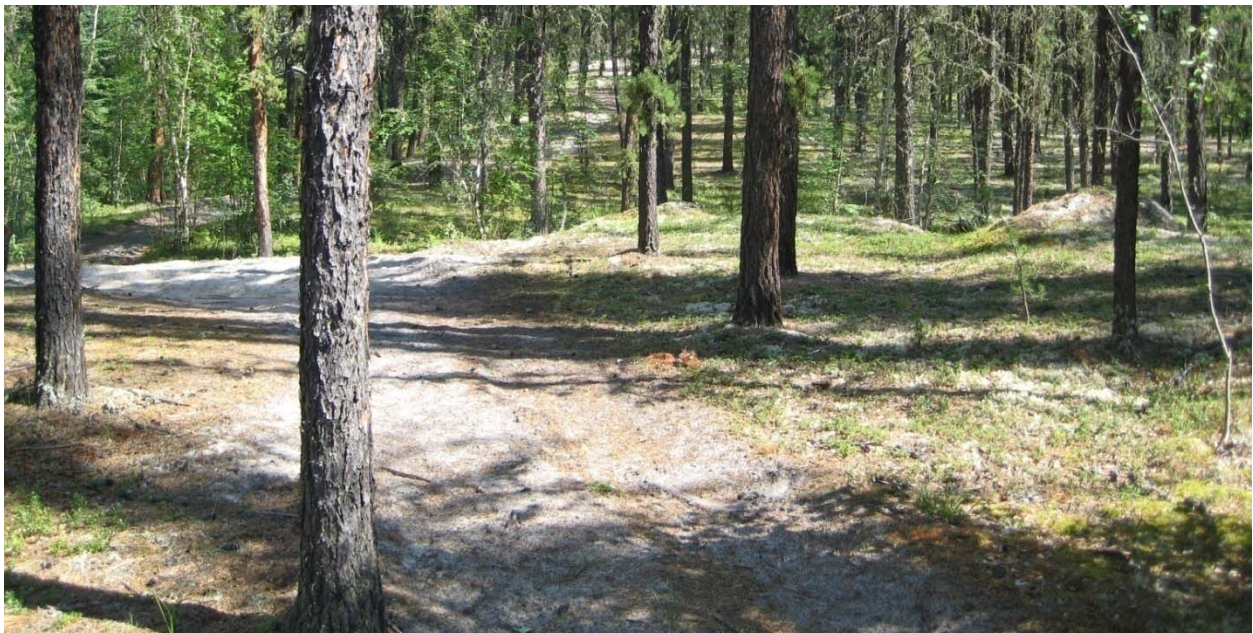


Figure 5.28. ATV trail running through HeOi-6.

Vegetation at the site is open pine forest with reindeer lichen, blueberry and cranberry forming the forest floor. Sphagnum moss occupies lower areas surrounding the site. River alder

and birch form a buffer zone between the low-lying areas near the McLean River and the higher landforms of the archaeological site.

5.2.14.2 Results

This site was defined by both subsurface testing and surficial finds. There were three positive subsurface tests and four different areas where surficial finds were located. Four negative subsurface tests helped to define the area of the site. The site area was determined to be 60 m in length and 30 m in depth. A soil profile was not recorded for this site.

There were a total of 19 lithic artifacts recovered from this site (Table 5.11). The two most common materials were quartz (n=10, 53% by count, 39% by weight) and chert (n=3, 16% by count, 47% by weight), followed by quartzite (n=6, 31% by count, 14% by weight). One of the quartzite artifacts was classified as a broken bifacial tool. Microscopic analysis in the laboratory showed edge wear from use. There was also one core made from chert. There was cortex on one of the chert flakes. Three of the quartz flakes and two of the quartzite flakes weighed under 0.1 g and were not included in the weight

Table 5.11. Lithic material by artifact type, HeOi-6

Artifact type	Lithic material					
	Chert		Quartz		Quartzite	
	n	Wt (g)	n	Wt (g)	n	Wt (g)
Flake	2	1	7	2.2*	5	0.8*
Shatter	--	--	3	3.8	--	--
Core	1	6.3	--	--	--	--
Broken tool	--	--	--	--	1	1.4
Totals	3	7.3	10	6*	6	2.2*

*3 quartz and 2 quartzite flakes weighed under 0.1g and were not included in the weight.

5.2.14.3 Interpretation

The diversity of materials here, as well as the site's size, may suggest that this site may have been at least a regional aggregation center or base camp of some sort; however, there was not much recovered in the way of artifacts, and more evidence would be needed to substantiate this interpretation. Although stratification was not observed, there is possibility that at least portions of this site may have been part of a flood plain, and stratified archaeological remains

may be found upon closer inspection and survey. A stratified site would be of archaeological importance because such sites are rare in the boreal forest.

5.2.15 HeOi-9, McLean River confluence

5.2.15.1 Description

This site is about 90 m southwest of HeOi-6 (Figure 5.1). It is on a landform in between the McLean River confluence and an unnamed creek that flows into the Clearwater northwest of the McLean River confluence. The vegetation here is typical open Jack pine forest with a reindeer lichen, blueberry and cranberry floor. An ATV trail that originates from HeOi-6 also passes by this site.

5.2.15.2 Results and Interpretation

Only one artifact was recovered here, which was a hole-in-top can (Figure 5.29). Unfortunately this artifact has a wide range of use from the late nineteenth century, starting in about 1885 to the 1960s or possibly even the 1970s (Margaret Kennedy, personal communication 2008). A cellar depression that contained a handful of cans similar to the one collected and some larger rocks was observed (Figure 5.30). A stove pipe and wire were also observed about 15 m north east of the depression. This site was most likely a historic trapper's cabin, although there was no wood or superstructure evident.



Figure 5.29. Bottom of hole-in-top can collected from HeOi-9.



Figure 5.30. Cans at HeOi-9.

5.2.16 HeOi-4, McLean River confluence

5.2.16.1 Description

HeOi-4 is about 52 km downriver from the Warner Rapids Bridge, on the east side of the Clearwater River and on the north side of the McLean River confluence (Figure 5.1). This site is across the McLean River from HeOi-6 and on the east side of the large pool in the Clearwater River. The site sits on a landform on the north side of the McLean River confluence. Like HeOi-6, the landform that this site sits on was created by flooding or downcutting of the McLean River. Although flood plain depositional stratigraphy was not observed during our survey, there is a chance that it may occur at deeper depths than our shovel tests were dug or was just difficult to observe. There is a large Precambrian outcrop to the north of the site, separating HeOi-4 from

HeOi-5 (Figure 5.31). The perimeter of this landform is defined by a low area surrounding it, causing it to look like a knoll. The size of this area is roughly 20 x 20 m.



Figure 5.31. Large outcrop separating HeOi-4 from HeOi-5. View to the northeast.

Vegetation here is typical open Jack pine forest with a reindeer moss, blueberry and cranberry floor. River alder is found along the Clearwater River and McLean River. Sphagnum moss and Labrador tea are found in an adjacent low area between HeOi-4 and HeOi-5.

5.2.16.2 Results

This site was found through subsurface testing, except for two metal artifacts that were lying on top of the organic mossy ground cover (Figure 5.31). These two artifacts were constructed from cans which were opened up and sewn together with wire; they were possibly used on the bottoms of sled skis. These artifacts were not collected, but a photograph was taken

of one of them (Figure 5.32). There were a total of six positive shovel tests and four negative tests. The site comprises the entirety of the landform and is approximately 20 m in length and 20 m in depth. The soil profile was not recorded for this site.



Figure 5.32. One of two ski runner remains (?) found at HeOi-4.

There were 50 lithic artifacts (Table 5.12) and three pieces of unidentifiable calcined bone found at this site. One of the Beaver River Sandstone artifacts displays a reddish rind on one side which may be interpreted as evidence of heat treatment. Microscopic analysis of one of the cutting edges shows wear, suggesting that this was a used tool. This piece appears to have been manufactured using burin technology, to be discussed further in section 6.2.3. There was also a retouched Beaver River Sandstone flake. There were what appear to be two broken tools or cores, one quartzite and one quartz. Because the negative flake scars appear to be very thin and small, it is more likely that they are broken tools. There were also two exhausted quartz core

fragments. The most common lithic material was quartz (n=30, 82% by count, 54% by weight), followed by Beaver River Sandstone (n=5, 10% by count, 23% by weight), chert (n=3, 6% by count, 4% by weight), and quartzite (n=1, 2% by count, 19% by weight). Fifteen quartz flakes and one quartz shatter weighed under 0.1 g and were not included in the weight.

Table 5.12. Lithic material by artifact type, HeOi-4

Artifact type	Lithic material							
	BRS		Chert		Quartz		Quartzite	
	n	Wt (g)	n	Wt (g)	n	Wt (g)	n	Wt (g)
Flake	3	2.4	2	0.9	30	3.5*		
Retouched flake	1	2.7						
Burin	1	5.5						
Core			1	0.8	2	16.8		
Shatter					8	3.5*		
Broken tool					1	1.1	1	8.7
Totals	5	10.6	3	1.7	41	24.9*	1	8.7

*15 quartz flakes and 1 quartz shatter weighed under 0.1 g and were not included in the weight.

5.2.16.3 Interpretation

This site was likely a base camp during precontact times, given its location at an important river confluence and transport route, and the diversity of lithic materials that were found. There may have been a trapping or hunting camp here during the Historic period; however, there were no depressions indicating any kind of structure. This site holds importance because it has obviously been used throughout a long period of time and is in a strategic location. Judging by the faunal material found here, it is most likely that there was a hearth on this landform at one time. What heightens the importance of this site is that it sits on a defined landform from which it would be easy to extract information. This is in contrast to HeOi-3, which is over 100 m long; HeOi-4 is only 20 m long. The chances of finding a hearth in further investigations on the smaller HeOi-4 are much greater than the much larger HeOi-3. In future excavations, it would probably be easier to more fully define the past use of HeOi-3 than any other site found in this project.

5.2.17 HeOi-5, McLean River confluence

5.2.17.1 Description

HeOi-5 is about 52 km downstream from the Warner Rapids Bridge, on the east side of the Clearwater River and on the north side of the McLean River confluence (Figure 5.1). This site is separated from HeOi-4 to the south by a large Precambrian outcrop. The two sites were deemed separate because of these landforms. HeOi-5 is on the north side of the McLean River from HeOi-6 and on the east side of the Clearwater River, across from HeOi-3. It is also on a small, well-defined landform surrounded by a low lying area, similar to that of HeOi-4. This landform is approximately 45 m in length and 15 m in width. The northwestern tip of this landform is another Precambrian outcrop that juts into the Clearwater River (Figure 5.33). This outcrop provided a suitable docking area for our canoes. The vegetation is typical open pine forest with a blueberry and cranberry floor. A low lying area that separates HeOi-4 from HeOi-5 contains sphagnum moss and Labrador tea.



Figure 5.33. HeOi-5 from the river looking east.

5.2.17.2 Results

There were two positive tests on this landform and two negative tests. The site has been recorded as being 35 m in length and 5 m in width, but it is most likely that the site covers the entire landform, as it did with HeOi-4. A soil profile was not recorded at this site. A total of

seven lithic artifacts were collected from this site (Table 5.13), including one tool. This is an endscraper made from almost transparent quartz. The most common material was quartz (n=4, 57% by count, 63% by weight) followed by chert (n=2, 29% by count, 14% by weight), and quartzite (n=1, 14% by count, 23% by weight).

Table 5.13. Lithic material by artifact type, HeOi-5

Artifact type	Lithic material					
	Chert		Quartz		Quartzite	
	n	Wt (g)	n	Wt (g)	n	Wt (g)
Flake	2	0.7	1	0.5	--	--
Shatter	--	--	2	0.6	1	1.2
Endscraper	--	--	1	2.1	--	--
Totals	2	0.7	4	3.2	1	1.2

5.2.17.3 Interpretation

This site did not produce much archaeological material. The small archaeological assemblage that comes from this site suggests that it may have only been a small hunting camp.

5.2.18 HeOj-1, Contact Rapids Portage

5.2.18.1 Description

HeOj-1 is about 53 km from the Warner Rapids Bridge, on the north side of the river, close to the end of Contact Rapids (Figure 5.1). The Contact Rapids portage trail is fairly close to this site, with HeOj-1 located on the north side of the portage trail. This site is not as close to the river as any of the other sites in this project, being a minimum of 130 m from the Clearwater River. The vegetation at this site is open Jack pine forest similar to most other sites in this project; however, there is a low lying area west of the site which provides more wetland vegetation, as well as a larger variety of plant species observed along better drained areas that were not seen previously in this survey. Among these were choke cherries in abundant quantities.

5.2.18.2 Results and Interpretation

This site included a cellar depression that was roughly 1.5 m in width and 2.5 m in length (Figure 5.34). Artifacts that were observed were a hole-in-top can, plastic oil containers, tin camp fuel containers and a cut-up 45-gallon oil drum. This site is most likely the remains of a historic trapper's cabin, but the site appears to have been used into the 1960s or 1970s based on the more contemporary garbage found in the cellar and around the site.



Figure 5.34. Cellar depression with an old bunk-bed frame and other artifacts at HeOj-1.

5.3 Conclusion

A total of seventeen sites were found in the course of this survey along the approximately 50 km of river valley that we travelled. It is important to stress that this was not an intensive survey, but more exploratory in nature, and only some of the areas that were deemed as being of high potential were actually examined. A more intense survey in certain areas should be

conducted in the future. Thirteen sites were precontact in nature, five were historic, and at least one site had both a historic and a precontact component. Seven of the sites were found in major confluence areas, and six were found on well drained landforms. Only two sites were found on a major portage; however, two other sites were found in areas close to, but not on, major portages. One site was found in an area of exceptional beauty based on current day perceptions, and may have been a sacred site. Major confluences seem to be an important indicator of site placement, as were areas at the bottom of falls or at rapids where the river forms small pools; however, this may also be a result of sampling bias, as a proportionally higher degree of survey time was invested in these areas.

In general, this portion of the Clearwater River seems to have high site density, and most of the places that were surveyed were found to contain a site. An exception to this was the Gould Rapids portage area. This is likely to have been a mandatory portage location in the past and present, although the two most experienced canoers on the team did run the rapids with empty canoes. This is a major portage that is over 1 km long, with plenty of well drained areas and flat spaces to set up a camp throughout. It would be natural to suspect that we would find at least one archaeological site in this area; however, after 60 subsurface tests, as well as an examination of more than a few exposures, no archaeological evidence was found.

There was little to no soil development encountered throughout this project, but where soils occurred, they are most aptly described as podzolic. There were no clear depositional stratigraphic layers encountered at any of the sites in the project, though some sites were located on landforms that may have experienced episodes of deposition from flooding.

Chapter 6: LITHIC ARTIFACT DESCRIPTIONS AND RAW MATERIAL USE

6.1 Introduction

A total of 657 chipped stone artifacts, 169 bone fragments, one bone tool and two metal cans were collected during this survey. Bone fragments were collected from four sites. Many of the bone fragments collected are unclear as to their cultural association, and-or have been broken up into fragments too small to be identified. In general, because of this, the bone fragments found in this survey are of little significance to the interpretation of the study area's archaeology. One exception is a historic First Nations bone tool found beside a fire hearth at HeOi-8 (Figures 5.26 and 5.27). This bone tool was manufactured from a moose metatarsal and is a longbone flesher. A brief description of this tool along with illustrations are provided in the site results in section 5.2.13.2, HeOi-8, McLean River confluence. There were many more metal artifacts found during this survey (for examples see Figure 5.29, 5.30, 5.32, 5.34); however, only two cans were collected and analyzed in the lab at the University of Saskatchewan because they had chronologically informative technological features. One can, collected from HfOh-2, may have been of quite recent manufacture, and is not considered further in this thesis, while the other can, collected from HeOi-9 (Figure 5.29), was of a type produced from the late nineteenth century (circa 1885) to the 1960s or 1970s (Margaret Kennedy, personal communication 2008), and further analysis of it is of limited value to this research. The collection of more metal artifacts would have been impractical given our mode of transportation. Some lithic tools were found during the course of this survey, but by far the majority of the artifacts were unretouched chipped stone debitage. This chapter will focus on the lithic tools and debitage collected.

6.2 Chipped stone artifacts

Of the 657 chipped stone artifacts found, the largest proportion were classified as debitage (n=623, 95%). Of the debitage, the majority were flakes (n=454, 72%), followed by shatter (n=169, 27%). The remaining lithic artifacts found during this fieldwork were classified as cores (n=9, 1%), retouched flakes (n=7, 1%), burins or pieces that displayed burin technology (n=3, 1%), FBR (n=4, 1%), endscrapers (n=3, less than 1%), broken bifacial tools (n=2, less than 1%), a broken sidescraper (n=1, less than 1%), and a projectile point preform (n=1, less than 1%). There was also some possible evidence of microblade manufacture. The percentage of

untouched debitage found during this fieldwork is typical of archaeological sites on a worldwide scale, where about 95% - 97% of all chipped stone artifacts are untouched debitage (Odell 2004:118). None of the tools found were clearly temporally or culturally diagnostic.

The exception is the potential microblade technology, which is found in the tool kit of the Northwest Microblade tradition and Pre-Dorset archaeological cultures and could be interpreted as being culturally and temporally diagnostic (see section 3.4.1, Northwestern Microblade tradition and/or Pre-Dorset); however, the evidence for this technology found during our archaeological survey is weak. Furthermore, there is not enough known about the archaeology in this region to understand the nature of its microblade technology if it is indeed recognized here. More research needs to be conducted in this area to confirm this technology, as well as to understand its nature if it is present.

6.2.1 Cores

A core is a rock, or a piece of rock, from which flakes are struck to be further reduced into usable tools (Bray and Trump 1982:67; Darvill 2003; 101; Kooyman 2000:14). Nine cores were found during this project (Figure 6.1, Table 6.1). Out of those nine, three different types were found, discoidal (n=4), blocky (n=1), and tabular (n=4). All of the discoidal cores were of quartz and quartzite, while the blocky and tabular cores were of Beaver River Sandstone and chert. This likely reflects the form in which the raw material is found, as well as the knapping qualities of these materials. Raw Beaver River Sandstone at the Quarry of the Ancestors is found in nodules that are blocky in shape, whereas quartzite and quartz can be found in the bottoms of rivers as rounded cobbles. All of the cores seem quite thoroughly exhausted with very little remaining of them. At least a few of these cores seem to display characteristics of a bipolar core that have been reduced by a method including an anvil stone and a hammer stone (Kooyman 2000:55-56).



Figure 6.1. Cores. Catalogue numbers from left to right: HfOf-4-24, HeOi-6-11, HeOi-3-6, HeOi-1-140, HeOi-7-2, HeOi-1-127, HeOi-1-149, HeOh-1-6, HeOi-6-1.

Table 6.1. Cores

Catalogue number	Length (cm)	Width (cm)	Thickness (cm)	Weight (g)	Material
HeOi-6-1	3.78	3.21	.96	6.3	chert
HeOh-1-6	2.23	1.28	1.04	2.9	chert
HeOi-1-149	4.15	2.1	1.20	5.6	chert
HeOi-1-127	3.75	2.73	1.20	10.9	chert
HeOi-7-2	2.80	1.78	1.00	3.8	quartz
HeOi-1-140	3.54	2.28	.65	6.3	BRS
HeOi-3-6	3.09	2.43	.95	5.3	quartz
HeOi-6-11	1.92	1.75	.53	1.4	quartzite
HfOf-4-24	2.93	2.30	1.42	6.9	quartz

It is interesting to note that one of the tabular cores, HeOi-1-127 (Figure 6.2, 6.3), displays negative flake scars that are microblade-like in shape. Five facets from this core may have produced microblade-like flakes averaging about 0.7 x 2.2 cm. Although this core does look somewhat similar to tabular and aberrant microblade cores found in the Yukon and Alaska (see Figure 3-E in Clark 2001a:72; Figure 4.14 in Powers et.al 1983:98), microblade-like flake scars on this objective piece may have been fortuitous and simply a result of an attempt to obtain the most of a scarce and valuable lithic resource, rather than a result of intentional microblade

manufacture. This flake also displays some of the characteristics of being a bipolar core, i.e. flake scars extending the length of the core, and the remains of cortex (Kooyman 2000:56).

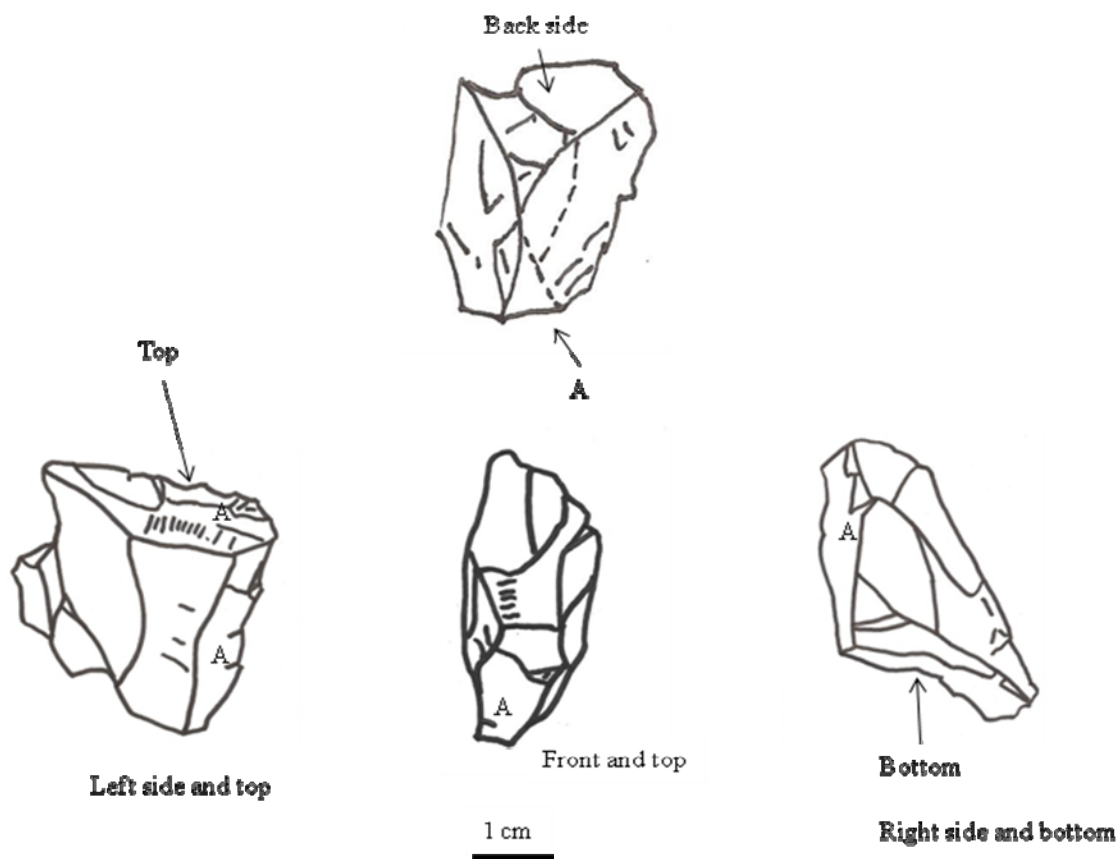


Figure 6.2. Illustration of a possible microblade core, catalogue number HeOi-1-127. “A” is marked on the front of the core for orientation.



Figure 6.3. Image of a possible microblade core, catalogue number HeOi-1-127. “A” is marked on the front of the core for orientation. Scale is in cm.

6.2.2 Retouched flakes

A retouched flake has been minimally modified on one or more of its edges (Kooyman 2000:100-101). There were seven retouched flakes found in the course of this research project (Figure 6.4, Table 6.2). All except one flake of Beaver River Sandstone were of quartz. All of the retouched flakes, except for HfOh-1-4, seem to display some form of use-wear such as rounding of the edges, micro-chipping, polish or striations.



Figure 6.4. Retouched flakes. Catalogue numbers from left to right: HfOh-1-4, HfOh-1-95, HeOh-2-12, HeOi-7-113, HfOh-2-2, HeOi-4-18, HeOi-7-73. White lines show retouched edges.

Table 6.2. Retouched flakes

Catalogue number	Length	Width	Thickness	Weight	Material
HfOh-1-4	2.61	1.87	.59	3.3	quartz
HfOh-1-95	2.99	2.19	1.75	5.2	quartz
HeOh-2-12	3.20	2.59	.68	4.4	quartz
HeOi-7-113	1.04	.88	.33	.2	quartz
HfOh-2-2	1.62	1.20	.55	1.0	quartz
HeOi-4-18	2.59	2.33	.38	2.7	BRS
HeOi-7-73	1.50	1.50	.34	.6	quartz

6.2.3 Burination

The definition of “burin” is somewhat contentious. The term burin is mostly closely associated with artifacts used specifically for engraving or chiseling (Barton et al 1996:111); however, use-wear studies suggest that the actual usage of burins is much more complex and they can more often be seen as multi-functional tools employed in cutting and scraping (Bahn 2001:72; Barton et al. 1996:122, 114, 115, 117; Tomášková 2005:86). Furthermore, there have been many artifacts classified as burins that show no evidence of use-wear. This seems to be especially true for micro-burins (Tomášková 2005:98). Additionally, some burins may have functioned as cores used to produce burin spalls, and may not have been intended to be used as tools at all (Barton et al. 1996:118; Mayer-Oakes 1986:107; Tomášková 2005:81, 87, 99, 105). For these reasons, my identification of a burin is based on the technique by which it was manufactured, not as its actual function (following Barton et al. 1996; Mayer-Oakes 1986, 107, 111, 115, 116; Tomášková 2005). In this study, burin technology simply suggests a technique that produces a specialized linear-shaped flake (Mayer-Oakes 1986:107). This technique usually consists of two steps: the first step is to produce a platform at a right angle to the area chosen for removal of a burin spall; the second is to apply a force to the platform which will remove a burin spall (Mayer-Oakes 1986:107).



Figure 6.5. Burination. From left to right (catalogue numbers) HeOh-1-3, HeOh-1-2, HeOi-4-50.

Burin technology was noted at site HeOi-4 (HeOi-4-50, Figure 6.5) and at site HeOh-1 (HeOh-1-2 and HeOh-1-3, Figure 6.5). The refitted flake (HeOh-1-2 and HeOh-1-3, Figure 6.5) displays crushing at the bottom and seems to have been intentionally struck from the top. It is very small, and it is difficult to ascertain what the intended purpose was for this artifact. One interpretation is that it may have been a failed attempt at producing a burin spall that was microblade-like in shape.

The Beaver River Sandstone burin spall that was found at HeOi-4 (catalogue number HeOi-4-50, Figures 6.5 and 6.8) is an unusual artifact that will be analyzed here in further depth. This artifact appears similar to what Kobayashi (1970) defines as a ski spall. This artifact is 5.0 cm long, 1.12 cm wide, 1.0 cm thick and weighs 5.5 g. It is made from a light gray (2.5Y 7/1) piece of Beaver River Sandstone. This ski spall appears to have been taken from a bifacial core using a technique similar to the Yubetsu technique (Figure 6.4 in this thesis, Andrefsky 2005:145, 148; Kobayashi 1970; 39, 47, 49, 50, 52). Kobayashi (1970) suggests that the Yubetsu technique is a method of creating a boat shaped microblade core through the reduction of a biface by striking it longitudinally and knocking off long linear flakes (ski spalls), resulting in a level platform along that edge of the biface (Figure 6.6; Morlan 1967). This artifact appears

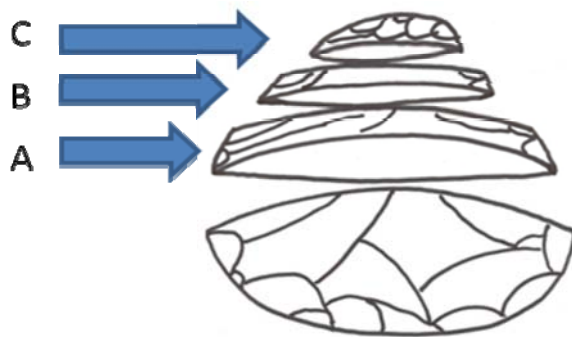


Figure 6.6. Yubetsu technique. A, B, and C demonstrate (burin) ski spalls taken from a bifacial core. The arrows signify the approximate location and direction of force applied to create the burin spall.

to be a ski spall that has had one end snapped off (catalogue number HeOi-4-50, Figure 6.7, steps 1-3). Both ends of this remaining portion appear to have been retouched to form sharp edges (Figure 6.7, step 4, and Figure 6.8). These edges display micro-chipping and rounding, suggestive of usewear. The lengths of the working edges are quite short, 0.6 cm and 0.9 cm.

Two hinge fractures on one side of this burin spall also indicate that at least two burin spalls have been removed from one edge of the ski spall tool to rejuvenate that edge (Meyer 1977:69). Given the shape of the tool and the shortness of the edges, it was likely used to incise bone, wood, or some other moderately soft material.

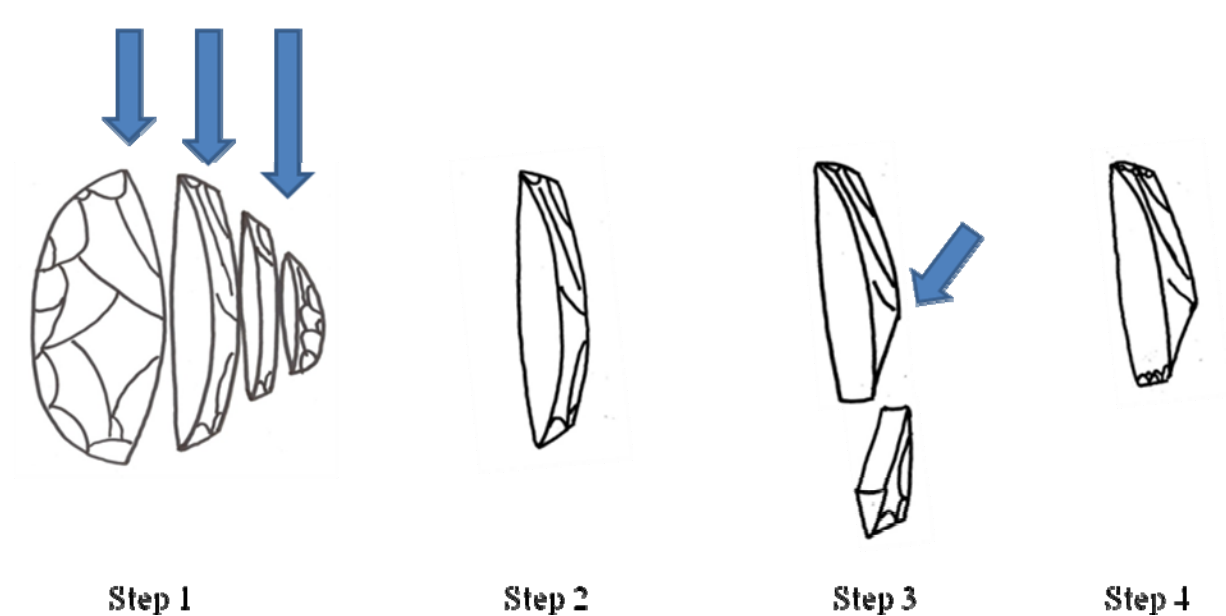


Figure 6.7. Possible steps in the manufacture of burin tool HeOi-4-50. The arrows signify the approximate location and direction of force applied to create the burin spall.



Figure 6.8. Ski spall/burin tool found at HeOi-4 (catalogue number HeOi-4-50). White lines show retouched edges. Scale in cm.

Table 6.3. Burination

Catalogue number	Length	Width	Thickness	Weight	Material
HeOh-1-3	2.17	0.66	0.43	0.5	Chert
HeOh-1-2	2.28	0.9	0.83	1.7	Chert
HeOi-4-50	5.0	1.12	1.0	5.5	BRS

6.2.4 Scrapers

The lithic tool classification of “scraper” is a functional classification that indicates that these tools were intended and used as hide scraping tools (Dyck and Morlan 1995:124). However, much of the research that has been conducted on this category of tool suggests that their actual usage was much more complex with the materials they were used on and their function being quite diverse (Andrefsky 2005:205-206; Kooyman 2000:99, 102; Morrow 1997:71; Odell 1981:333, 335, 336). This said, the category of scraper still maintains utility because most archaeologists will likely have a good idea of the morphological traits of such tools. For these reasons, the definition of scraper used in this thesis will focus on tool morphology as opposed to tool use. A primary scraper characteristic that will be used here will be the steepness of the working edge (Kooyman 2000:102). The determination of whether these tools had a high versus low edge angle was subjective. Three different types of scrapers have been found in this research: endscraper, thumbnail scraper, and sidescraper. These different scraper types and descriptions of those found during our survey will be further discussed in the following sections.

Table 6.4. Scrapers

Catalogue number	Scraper classification	Length	Width	Thickness	Weight	Material
HfOh-1-96	endscraper	5.32	2.52	1.3	16.5	quartz
HeOi-5-5	endscraper	2.42	1.4	0.65	2.1	quartz
HfOh-1-1	endscraper	1.55	1.16	0.79	1.3	BRS
HfOh-1-97	thumb-nail scraper	1.69	1.55	0.7	1.5	quartz
HeOi-3-20	sidescraper	2.78	1.73	0.66	3.1	chert

6.2.4.1 Endscrapers

Endscrapers are scrapers that have working edges that are transverse to their long axes (Dyck and Morlan 1995:124; Kooyman 2000:102). Three endscrapers were found in this research (Figures 6.9, 6.10, 6.11; Table 6.4). The first endscraper was found at HfOh-1

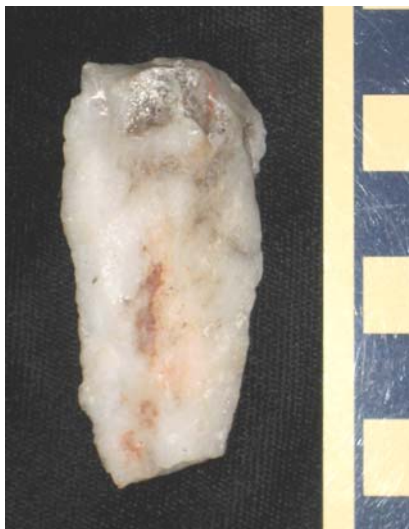


Figure 6.9. Endscraper, catalogue number HfOh-1-96. Dorsal side up, proximal (working) edge towards top. Scale in cm.

(catalogue number HfOh-1-96, Figure 6.9). This specimen is made from white (2.5YR 8/1) vein quartz and is quite large. Its transverse cross section is triangular. The working edge is quite steep and is on the proximal portion of the flake from which it was manufactured. Use-wear was not evident on this tool; however, because quartz is an extremely hard lithic material, use-wear may not be evident from limited use on softer material (Sussman 1985). Viewed from the top, the sides of this scraper taper to the distal end at a slight angle. The distal end of the tool appears to have been broken off.

A second endscraper made from a translucent, almost glass-like, quartz was found at HeOi-5 (catalogue number HeOi-5-5; see Figure 6.10, Table 6.4). Its dimensions are 2.42 x 1.40 x 0.65 cm, and it weighs 2.1 grams. The transverse cross section of this scraper is triangular. The working edge is fairly steep and is on the proximal portion of the flake from which it originated. It has only been worked on the dorsal side of the flake, but may have sustained some damage on the ventral side from use, as a small portion seems to have been broken from this

edge. Viewed from the top, the sides are almost parallel. It appears that the distal end of this tool may have broken off.



Figure 6.10. Endscraper, catalogue number HeOi-5-5. Dorsal side up, proximal (working) edge towards top of page. Scale in cm.

A third endscraper made from gray (10YR 6/1) Beaver River Sandstone was found at HfOh-1 (catalogue number HfOh-1-1, Figure 6.11, Table 6.4). A portion of the tool also displays a reddish rind, indicating that the material from which this was manufactured was likely heat-treated. The transverse cross section of this scraper is triangular. The working edge is steep and is on the proximal portion of the flake from which it originated. Micro-chipping on the ventral side of the working edge may indicate that this tool has been retouched, or that the tool may have sustained some damage here due to severe use. Viewed from the top, this scraper takes on an elongated fingernail appearance and was initially classified as a thumbnail scraper; however, because the distal end of this scraper appears to have been broken off, it is likely that this tool was a hafted endscraper before it was broken. The distal ends of all of the artifacts classified as endscrapers appear to have been broken, suggesting that they may have been hafted to a wood or bone handle, and were broken off at the haft during use.



Figure 6.11. Endscraper, catalogue number HfOh-1-1. Dorsal side up, proximal (working) edge towards top of page. Scale in cm.

6.2.4.2 Thumbnail scrapers

Thumbnail scrapers are thus named because they are shaped similar to a thumbnail (Kooyman 2000:102). The small size of thumbnail scrapers also suggests that they were not hafted. One thumbnail scraper made from white (10YR 8/1) quartz was found at HfOh-1 (catalogue number HfOh-1-97, Figure 6.12, Table 6.4). The cross section profile of this scraper is hemispherical with a slight ridge on the top. The working edge is steep and is on the proximal portion of the flake from which it originated. Viewed from the top, this scraper has the identifying fingernail shape. The working edge has only been knapped on the dorsal side.



Figure 6.12. Thumbnail scraper, catalogue number HfOh-1-97. A side view of the thumbnail scraper with the dorsal side up. The sharpened edge of the tool is on the left side. Scale in cm.

6.2.4.3 Sidescrapers

Sidescrapers have a working edge parallel to the long axis of the tool (Kooyman 2000:102). One broken sidescraper made from grey (2.5Y 5/1) fine-grained chert was found at HeOi-3 (Figure 6.13, Table 6.4). Most of the dorsal side and a small portion of the ventral side of



Figure 6.13. Broken sidescraper, catalogue number HeOi-3-20. Dorsal side up, broken end is on the left, steep angled edge on the side closest to the scale. Scale in cm.

this scraper is covered with a white-and rust-colored patina. There are two working edges on this artifact with the longest working edge being steeply angled. The opposite edge has a much

lower angle. Although this artifact has been classified as a scraper because of the dominant edge, it is quite possible that this tool may have functioned as a multipurpose tool. In general, the majority of the knapping of this tool appears on its dorsal side; however, there have also been some fine flakes removed from the ventral side. Viewed from the top, it is somewhat triangular in shape. The transverse cross section of this scraper is semicircular. Micro-chipping and/or possible crushing indicates some use-wear on the steep-angled working edge. This artifact is only partially complete; one end appears to have been broken off.

6.2.5 Bifacially flaked tools

A bifacially flaked tool has been flaked on two sides so that these surfaces meet to form an edge (Kooyman 2000:253). One bifacially flaked tool made from very pale brown (10YR 8/2) quartzite was found at HeOi-4 (Figure 6.14, Table 6.5). Because it is broken and represents only a partial tool, it is difficult to ascertain the form of the original tool. One side of this specimen is bifacially flaked, but the other is unifacially flaked with a steep edge, somewhat similar to that of the sidescraper discussed in the previous subsection (Figure 6.13). Unfortunately there is not enough remaining of this piece to classify it as a scraper or multifunctional tool.



Figure 6.14. Broken bifacial tool, catalogue number HeOi-4-2. Dorsal side up, broken end on the left side. Scale in cm.

Table 6.5: Bifacial tool

Catalogue number	Length	Width	Thickness	Weight	Material
HeOi-4-2	3.67	2.6	0.97	8.7	quartzite

6.2.6 Projectile point preform

A preform represents the stage of an artifact before it takes its form as a finished tool (Andrefsky 2005:32, 260; Dyck and Morlan 1995:125; Kooyman 2000:47). Tools classified as preforms usually lack one or more of the characteristics of finished tools, such as the side or corner notches of a projectile point (Dyck and Morlan 1995:125). A very pale brown (10YR 8/2) quartzite projectile point preform was found at HeOh-2 (Figure 6.15, Table 6.6). This specimen is broken at the distal end. The majority of flakes taken from this tool have been removed from the dorsal side, but there is also some flaking evident from the ventral side. The base of this preform was made concave by one or two flakes being removed on the dorsal surface of the artifact. There was also one notch removed from the dorsal surface near the base. There does seem to be some use-wear in the form of micro-chipping and rounding at the edges. The area proximal to the basal notch does not display the same micro chipping characteristics, suggesting that the wear seen on the edges was incurred through use and is not likely a post-depositional phenomenon.

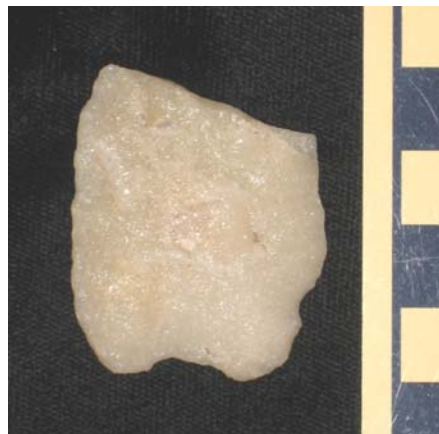


Figure 6.15. Projectile point preform, catalogue number HeOh-2-15. Dorsal side up, broken side on the right, base of the preform on the left. Scale in cm.

Table 6.6. Projectile point preform

Catalogue number	Length	Width	Thickness	Weight	Material
HeOh-2-15	3.95	3.26	0.58	10.6	quartzite

6.2.7 Microblade-like flake

By definition, a microblade is a flake that usually has two or more linear flake scars on its dorsal surface, is long and rectangular, has parallel or sub-parallel sides, is twice as long as it is wide, and is relatively small, generally being less than 2cm wide, 5 to 7 cm long, and 5 mm thick (Andrefsky 2005:207, 253, 258; Bahn 2001:59, 292; Clark 2001a:64; Kooyman 2000:170, 174; Mayer-Oakes 1986:97-99). Another important characteristic of a microblade is that it must be struck from a systematically prepared core (Andrefsky 2005:207). In the past, microblades and blades have also been called lamellar blades (Kooyman 2000:12; Solecki 1955:393); however, even though lamellar blades are of similar shape and size to blades and microblades, they are a product of unintentional manufacture (Kooyman 2000:12). Although some cores in our survey may have had microblade-like flakes struck from them, these cores are far from being typical microblade cores and the microblade-like facets seen on these cores may have been fortuitous. Because there were no indisputable microblade cores found in our survey that show intentionality of manufacture, and what has been found may have been created inadvertently, the term microblade-like flake will be used. There were also a number of flakes found in this research that may meet the defined description of microblade; however, no typical prepared microblade cores were found, and it is possible that most of these artifacts, except perhaps for artifact HfOh-1-81 (Figure 6.16, Table 6.7), were fortuitous in nature.

Artifact HfOh-1-81 is a flake that is rectangular in outline and is made from a light bluish gray (Gley 2 7/5PB) mudstone that has a whitish patina with black speckles on it. It has at least one negative step fracture flake scar on its dorsal surface, and appears to have been snapped off at both its proximal and distal ends creating two short edges. There are some areas along the dorsal surface that may be additional negative flake scars, but they are not definitive, and may be the result of the fracture qualities of the lithic material. Its shape appears to have been intentionally enhanced by the removal of its proximal and distal ends, suggesting that it was intentionally manufactured for use as a microblade; however, there does not appear to be any wear on this artifact to suggest that it was used as such.



Figure 6.16. Microblade-like flake HfOh-1-81. Scale in cm.

Table 6.7. Microblade-like flake

Catalogue number	Length (cm)	Width (cm)	Thickness (cm)	Weight (g)	Material
HfOh-1-81	2	0.86	0.35	0.4	mudstone

6.3 Raw material use

The majority of lithic artifacts found during our survey were made from quartz (n=550, 84% by count, 78% by weight [see Tables 6.8, 6.9 and Figures 6.17, 6.18]) distantly followed by Beaver River Sandstone (n=45, 7% by count, 6% by weight [see Tables 6.8, 6.9 and Figures 6.17, 6.18]), chert (n=34, 5% by count, 9% by weight), quartzite (n=21, 3% by count, 6% by weight [see Tables 6.8, 6.9 and Figures 6.17, 6.18]), sandstone (n=2, less than 1% by count, 1% by weight [see Tables 6.8, 6.9 and Figures 6.17, 6.18]), conglomerate (n=2, less than 1% by weight or count [see Tables 6.8, 6.9 and Figures 6.17, 6.18]), mudstone (n=2, less than 1% by weight or count [see Tables 6.8, 6.9 and Figures 6.17, 6.18]), and unknown materials (n=1, less than 1% by weight or count [see Tables 6.8, 6.9 and Figures 6.17, 6.18]). Although it is possible

Table 6.8.
Total lithic materials by count

Material	BRS	Chert	Conglomerate	Mudstone	Quartz	Quartzite	Sandstone	Unknown
Number	45	34	2	2	550	21	2	1

that some of the quartz, quartzite and chert may be from a non-local source, the simplest explanation suggests that it is most likely that these materials were procured from local Precambrian shield outcrops or glacial tills (Millar 1997:121). Quartz outcrops are ubiquitous throughout our survey area. The larger overall size of the quartz debitage found during this fieldwork also suggests a more primary stage of artifact reduction, further indicating the procurement of locally available material. While some of the chert may be non-local, cortex was present on much of the chert debitage (n=6, 18% by count), also suggesting primary stage

reduction and a likely local origin for the raw material. The only non-local material that was recognized in the assemblage was Beaver River Sandstone. At this time, the only known source of knappable, high-quality Beaver River Sandstone is from the Quarry of the Ancestors near Fort MacKay (Saxberg 2007:13); however, there has been some speculation about possible alternative sources of this lithic material on the Clearwater River (Fenton and Ives 1982:188; Korejbo 2008a). It is interesting to note that one of the sites, HeOi-3, had a rather high proportion of Beaver River Sandstone (n=17, 38% by count, 9% by weight), almost surpassing the presence of quartz (n=18, 40% by count, 77% by weight). What this high proportion of BRS may indicate will be discussed further in section 7.4.3.

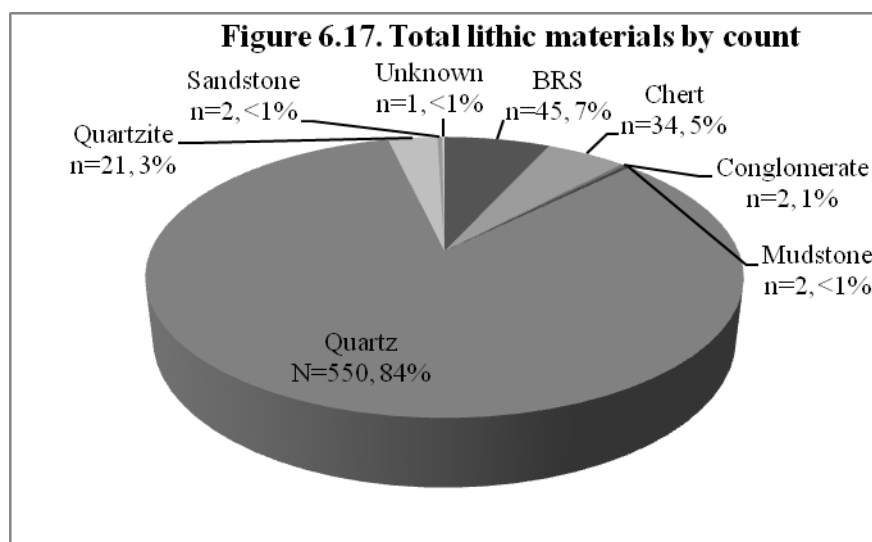
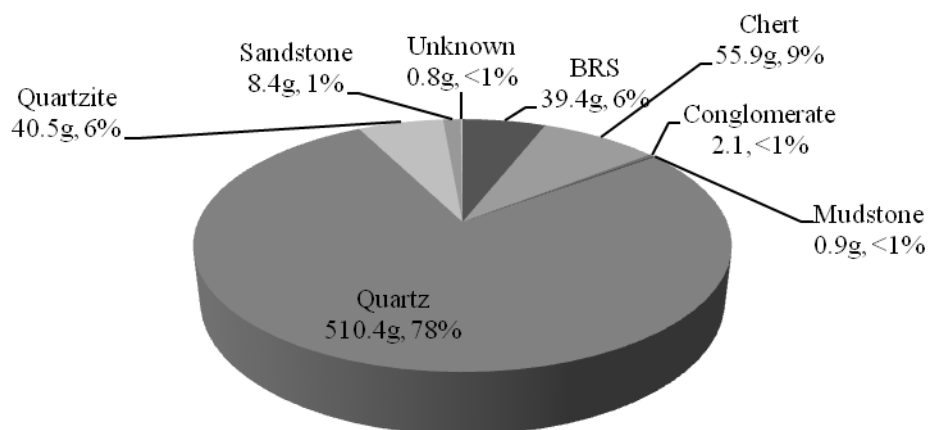


Table 6.9.
Total lithic material
by weight

Material	BRS	Chert	Conglomerate	Mudstone	Quartz	Quartzite	Sandstone	Unknown
Weight	39.4	55.9	2.1	0.9	510.4	40.5	8.4	0.8

Figure 6.18. Total lithic materials by weight



6.3.1 Proportion of lithic tools per lithic material

There was some variety in the proportions of tools to debitage within each type of lithic raw material present (Figure 6.19, Table 6.10). Quartz had the lowest percentage of tools at 2% (10 tools of a total of 550 pieces), followed by Beaver River Sandstone at 7% (2 tools of a total of 45 pieces), and chert at 9% (3 tools of a total of 34 pieces), and quartzite at 14% (3 tools of a total of 21 pieces). Burin technology was only noted in one Beaver River Sandstone artifact and two chert artifacts that refitted to form a single piece.

Figure 6.19. Percentage of tools/total lithic material

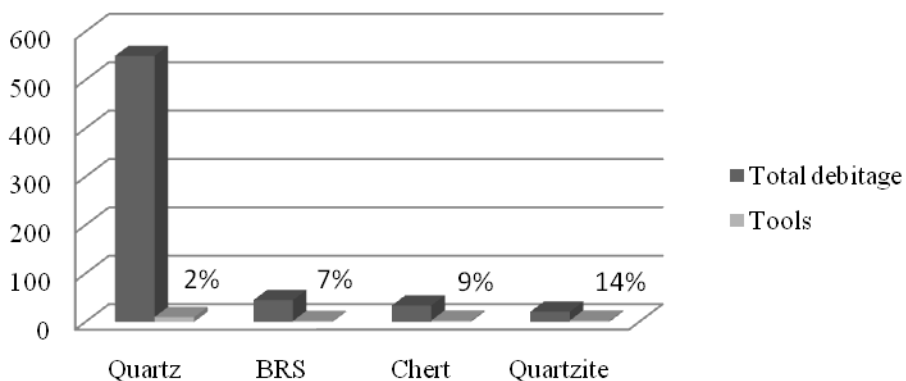


Table 6.10:Percentage of tools/lithic material

Material	Quartz	BRS	Chert	Quartzite
Total debitage	550	45	34	21
Tools	10	2	3	3
% of tools/total lithic material	2	7	9	14

6.3.2 Distribution of Beaver River Sandstone in our survey area

Beaver River Sandstone is a fairly well represented lithic material in this survey (Figures 6.17, 6.18, and 6.19, Tables 6.8, 6.9, 6.10). The proportions of Beaver River Sandstone found at each site in our survey was entered into the Sigma Stat program, to construct four scatter plot graph (Figures 6.20, 6.21, 6.22, and 6.23). Because the most likely source for this material is the Athabasca River Valley near Fort MacKay Alberta, the distances used in the following analysis were measured via the Clearwater River and Athabasca drainages from each site in our survey area to the Quarry of the Ancestors. The first graph (Figure 6.20) uses the distance from the Quarry of the Ancestors, and the percentage of artifacts made from Beaver River Sandstone by frequency from each site. The second graph (Figure 6.21) uses the distance from the Quarry of the Ancestors and the percentage of artifacts made from Beaver River Sandstone by weight. The third graph (Figure 6.22) uses the distance from the Quarry of the Ancestors and the average weight of BRS artifacts at each site, and the fourth graph (Figure 6.23) uses the distance from the Quarry of the Ancestors and the median weight of BRS artifacts at each site. These graphs seem to show a trend of gradual drop-off of Beaver River Sandstone use throughout the approximately 50 km of surveyed area (Figures 6.20, 6.21, 6.22, and 6.23). This drop-off is not rapid and is somewhat variable between the sites. The sharpest drop-off can be seen in the frequency (Figure 6.20) and weight (Figure 6.21) of Beaver River Sandstone in assemblages further from its source, while the smallest drop off can be seen in the average (Figure 6.22) and median flake size (Figure 6.23) further from its source. Because of the small sample size, it is not possible to conduct a statistically valid analysis; however, further archaeological research conducted in the future may enable a more robust examination of Beaver River Sandstone drop-off. It is interesting to note that a survey conducted by Meyer (2010) immediately upriver from our survey did not result in the identification of any Beaver River Sandstone artifacts whatsoever.

Figure 6.20. Beaver River Sandstone plot by frequency.

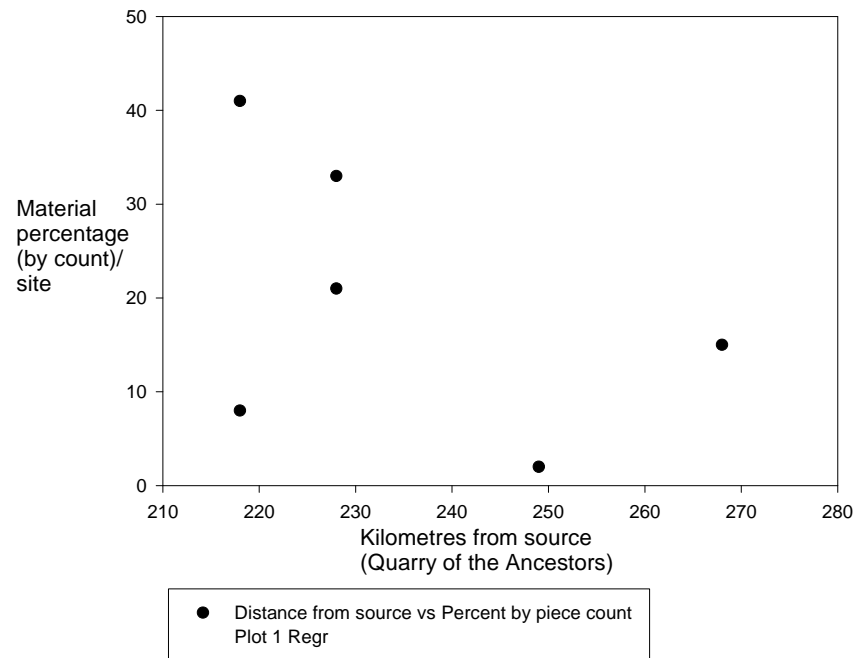


Figure 6.21. Beaver River Sandstone plot by weight.

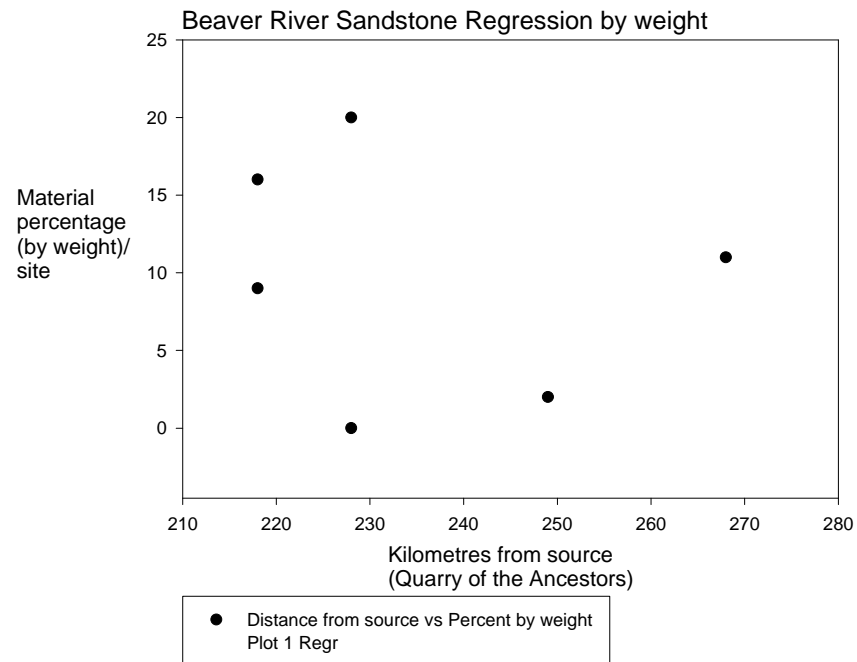


Figure 6.22. Beaver River Sandstone plot by site and average debitage weight.

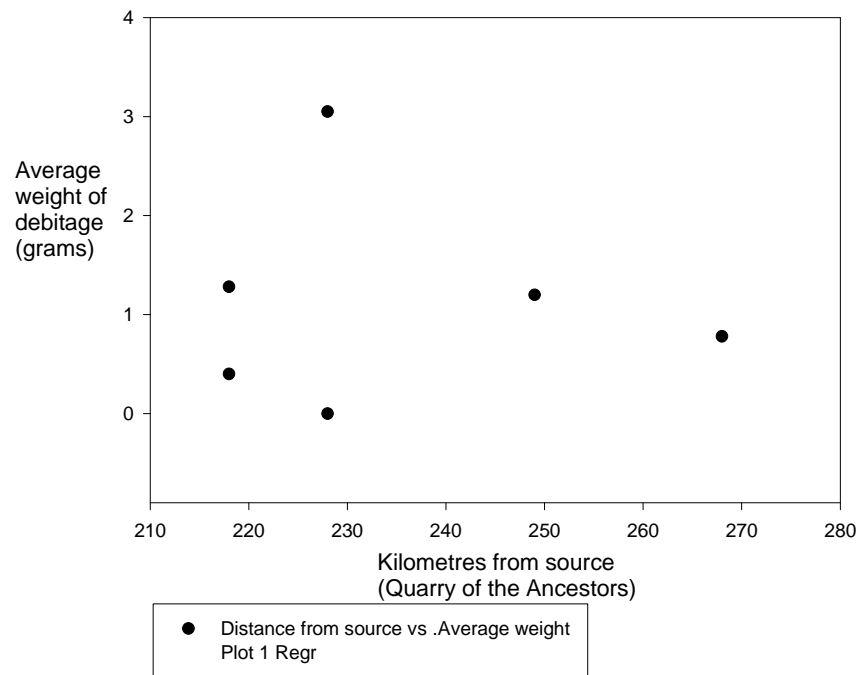
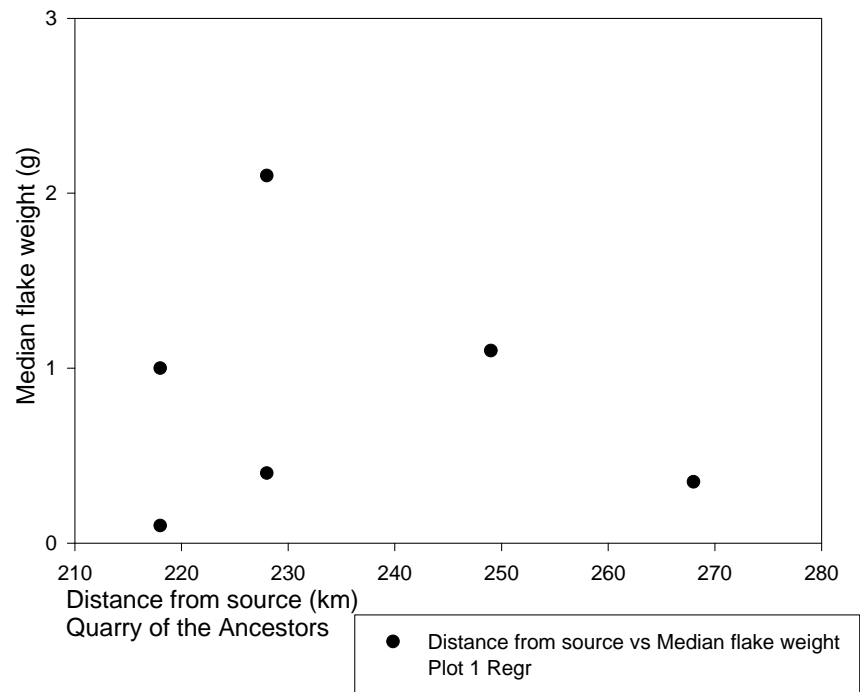


Figure 6.23. Beaver River Sandstone plot by site and median weight.



6.4 Conclusion

The survey portion of this project resulted in the recovery of 657 lithic artifacts, of which 95% (by count) were classified as unmodified or untouched debitage. The remaining 5% of the artifacts have been classified as cores, retouched flakes, endscrapers, thumbnail scraper, a broken bifacially flaked tool, a sidescraper, and a projectile point preform. There were no culturally diagnostic artifacts found during this survey; however, possible evidence for microblade-like technology was found as well as burin technology. More research needs to be conducted to confirm or refute the presence of these technologies here.

Of the lithic materials found during this research, quartz was significantly predominant (84% by count, and 78% by weight). Other materials used were Beaver River Sandstone, chert, quartzite, sandstone, conglomerate, and mudstone. It is likely that all of the materials except for Beaver River Sandstone are of local origin. The only material that was found that can be sourced to a specific area is Beaver River Sandstone, which most likely comes from the Quarry of the Ancestors in the Fort MacKay region of northeastern Alberta. Beaver River Sandstone makes up a total of 7% of the assemblage by count (6% by weight), but it makes up as high as 38% (9% by weight) of the lithic proportions at one site, and is quite well represented at a number of other sites. Using data from this survey, regression analysis was conducted on this material. Although the data from our research project is too sparse to make any definite conclusions on the drop-off of Beaver River Sandstone, there does seem to be at least some drop-off in the usage of this material the further one gets from the source along the Clearwater River Valley.

Although Beaver River Sandstone is a well represented lithic material in our survey area, the possibility that it has been locally procured in our survey area is not supported by our data, and at least this portion of the Clearwater River can probably be ruled out as an alternative source for Beaver River Sandstone. This will be discussed further in section 7.4.3. Still HeOi-3 had a rather high proportion of Beaver River Sandstone (n=17, 38% by count, 9% by weight), almost surpassing the amount of quartz (n=18, 40% by count, 77% by weight), possibly suggesting a closer source of Beaver River Sandstone. Alternatively, the distribution that we found along this river valley may suggest a continuation of Beaver River Sandstone drop-off along this river through its use by a single cultural group, or through trade between groups. The distribution of Beaver River Sandstone will be further discussed in subsection 7.4.3.

The percentage of tools relative to the total artifact count of each material type was lowest for quartz at 2%, while the highest was for quartzite at 14 %. Beaver River Sandstone and chert proportions were intermediate at 7% and 9% respectively. The poor fracture quality of quartz likely influenced the low proportion of tools made from this material; however, the trend of lower proportions of tools made from lower quality toolstone is not supported with the data collected for quartzite, which showed a high proportion of tools made from this relatively low quality material. Both chert and Beaver River Sandstone are no doubt of higher knapping quality, and a higher proportion of tools made from these materials would be expected, but was not found. The low sample size may also invalidate these percentages, and more research would greatly increase the precision of our knowledge of artifact usage in our area. It does, however, seem safe to conclude that quartz is the predominant lithic material found there.

CHAPTER 7: DISCUSSION, SUMMARY AND CONCLUSION

7.1 Introduction

This chapter provides an additional discussion of some topics that were introduced in previous chapters and an overall summary of this research project. The topics discussed will fall under four main areas: 1) environment and culture; 2) site distribution; 3) lithic raw materials and; 4) lithic technologies. Environmental topics that are discussed include the relationship between migratory caribou and bison and how this may have influenced the cultures in this valley. The discussion of site distribution will offer an interpretation of areas of high versus low archaeological site density. The section on lithic raw materials will explore the occurrence of local versus non-local lithic materials, the fracture qualities of clear quartz, the distribution of Beaver River Sandstone, and the source area(s) for chert. Last, lithic technologies found in the Clearwater River Valley, specifically heat treatment and possible microblade technology will be discussed, with a particular focus on the latter and its cultural affiliation.

7.2 Environment and culture

Paleoenvironmental evidence suggests that there was a northern expansion of the grasslands due to Hypsithermal warming and drying between 8,400 and 6,400 BP. The Clearwater River survey area was likely a parkland/mixed forest region at this time, attracting migratory bison, especially during the winter season (see subsections, 2.5.2, 2.9.2; Hickman and Schweger 1996:166; Johnson 1989; Morgan 1980:154; Ritchie 1989:511; Vance et al. 1995:94). Because bison behavior is somewhat predictable, and their numbers would have been quite substantial, it is likely that the behavior of these animals would have had a profound effect on the people living here (see subsection 2.5.2; Campbell et al. 1994:361; Keith and Reynolds 1994; Morgan 1980; Roe 1970:505). Migratory bison would have spent their summers to the south, and would have migrated north to their wintering range (Morgan 1980:150, 157). Significantly, bison form large aggregations in the winter in somewhat predictable locations, and it is likely that the Clearwater River Valley may have provided an exceptional area for bison wintering in this part of the province (Gordon 1975:21-22; Morgan 1980; Pollock 1978:9). It is therefore reasonable to suggest that many of the archaeological sites dating to this time period in the

Clearwater River Valley were occupied from late fall to early spring, a time when bison would be plentiful.

During the period of warmer, drier conditions from 8,400 to 6,400 BP, the limit of the Plains area and the limit of the Barrenlands would have moved further north than in the previous or subsequent time frames, and the northern range of migratory bison would have likely included the Clearwater River Valley survey area (see section 2.5.2, 2.9.2). From about 6,400 BP onward northwestern Saskatchewan experienced a change in environmental and climatic conditions leading to present conditions. During portions of this period, the southwestern range of the Beverly Caribou herd would have likely included the Clearwater River survey area (see subsections 2.5.1, 2.9.2; Holland and Kkailther 2003:130; Millar 2009:21). These animals were of utmost importance to the Dené and their ancestors (Brumbach and Jarvenpa 2006:26, 28, 29, 35; Burch 1991:440; Gordon 1996; Sharp 1978; 59). At present the Beverly Caribou herd spend their summers in the Barrenlands near their calving grounds north of Beverly Lake and the Thelon River, then migrate south in the fall, reaching their southern limit and wintering grounds shortly after the beginning of November (Beverly and Qamanirjuaq Caribou Management Board 1999:8, 27; Gordon 1996:10; Nesbitt and Adamczewski 2009:11; Williams 1995:4-5). Historically, the Dené would aggregate at the headwaters of the Clearwater River (section 3.6; Figure 4.1). When the Beverly herd began their northward migration in the spring, the Dené would continue their seasonal round via the Clearwater River and Athabasca River when it was safe to use those rivers for boat travel. When the Caribou wintering area was further south during earlier precontact times, either in the Clearwater River area or in areas south of the Clearwater (section 2.5.1), these aggregation areas likely would have occurred on more southerly reaches of the Clearwater River. Because of their placement on lower portions of the Clearwater River, and because of their large size as well as other characteristic features of aggregation centres which are discussed further in subsection 7.3.1, some sites found during this research, i.e. HfOf-4 at Warner Rapids, HeOi-1 at Skull Canyon, and the group of sites HeOi-3, HeOi-4, HeOi-5, HeOi-6, HeOi-8 and HeOi-9 found at the McLean River confluence (Figure 5.1), are suspected of this usage.

7.3 Site locations

7.3.1 Areas of high site density: aggregation centres

The number of archaeological sites found during this project suggests that the Clearwater River Valley has had a very rich past, and that this portion of the western boreal forest is not limited in its archaeological resources, contrary to some traditional assumptions about precontact population density and evidence in this region. Furthermore, some of the sites found in this valley are very substantial. It is apparent from this research that the Clearwater River Valley was an important area for precontact peoples. The large size of some of these sites suggests that these people not only used this river as a mode of transportation to get from point A to point B, but likely spent some more substantial time here as well, possibly using some of the areas within this valley as important aggregation centres. Localities suspected of this use include the Warner Rapids area (HfOf-4), the McLean River confluence (HeOi-3, HeOi-8, HeOi-6, HeOi-4, HeOi-5), and possibly the Skull Canyon area (HeOi-1). These areas and the site(s) within them have characteristics of aggregation centres, including: 1) large site size; 2) a location at or near a transportation crossroads; 3) the availability of large quantities of food resources; 4) relatively high artifact diversity, and; 5) occurrences of non-local artifacts (Conkey 1980:612; Meyer 1998:74; Meyer et al. 1992:216-220; Sanger 1996:523). Multiple sites within these areas, such as the McLean River confluence, may reflect contemporaneous occupations by different kin or ethnic groups aggregating at the same event or events; however, the interpretation of contemporaneity would be difficult to support given the problems of dating in the boreal forest. Alternatively, some of the larger sites in this research area may be evidence of locations that have been repeatedly revisited over a long time period, possibly serving as seasonal base camps occupied while resources like bison or caribou were available (subsection 7.5) or perhaps for other unknown purposes. The possibility that they were seasonal fishing sites cannot be ignored either, since two of these areas (Warner Rapids, HfOf-4, and Skull Canyon, HeOi-1) have evidence of current usage as such.

7.3.2 Areas of low site density: geomorphic and cultural reasons

We found an archaeological site at almost every area that we stopped during this survey; there were, however, some exceptions to this rule. Because these areas, in particular the Gould

Rapids area (subsection 5.2.5, Figure 5.1) and the Smoothrock Portage area (HeOh-2, subsection 5.2.6 and 5.2.7, Figure 5.1), appeared to offer favourable camping spots where numerous tents could be set up, and were in locations that currently require mandatory portage, it is intriguing that no archaeological sites or only small sites were found during the survey. The simplest explanations for a lack of substantial sites in areas of high archaeological potential are geomorphic ones, such as the river changing course or the river eroding its banks and destroying archaeological sites. High energy rivers such as the Clearwater River are especially prone to the poor preservation of archaeological sites due to their very active erosional regimes and course changes (Butzer 1982; Schiffer 1987:252; Turnbaugh 1978; Waters 1992:127); however, cultural explanations cannot be dismissed.

One cultural reason for the avoidance of some areas may have been the presence of supernatural beings in those areas. An example of an avoidance belief is the current Cree belief of Memekwesiw. Memekwesiw are little men who do not have noses, live in caves and are feared and avoided because of their powerful medicine, and it is believed that they can be dangerous if they are in some way offended (Lipsett 1990:75, 124-126). There were two observations during this survey that may support cultural reasons for avoiding certain areas along this river. The first observation was along the Gould Rapids Portage, where there was a small feature built around a small cavity in a Precambrian outcrop, which may have been considered a cave for Memekwesiw (Figure 5.8). This may have been constructed to appease the Memekwesiw. Another observation was at our campsite at the McLean/Clearwater River confluence, where what looked like an offering of tobacco was placed in a small cavity in a Precambrian outcropping. Again, this behavior may suggest that it was given to the inhabitants of the rock to appease them. Although I did not find a reference to Memekwesiw in Athapaskan belief, an Athapaskan belief such as the avoidance of “bushmen” could be responsible for the avoidance of certain areas (Cruikshank 1979:38). These beliefs, or belief in some other supernatural phenomenon, may have led to the avoidance of these areas of the Clearwater River, or to the restrictions of activities to ceremonial ones that are unlikely to have left much archaeological evidence.

7.3.3 Evaluation of archaeological potential

Pollock's (1978) research suggested river narrows, sharp bends, terraces over eight meters in height, and portages were good predictors of high site potential. I added proximity to the geological Dina/McMurray formation, modern campsites, river confluences, well drained and level landforms, and subsurface exposures to my criteria to determine archaeological potential. The results of this research project allow me to reflect on the validity of these criteria. The most important predictor of site density seemed to be well drained and level landforms, which were characteristic of all the sites found, as well as areas where the river has broadened to form a large pool, which was characteristic of ten of our sites (HfOh-2, HfOf-4, HeOi-1, HeOi-2, HeOi-3, HeOi-4, HeOi-5, HeOi-6, HeOi-8, and HeOi-9). These large pool areas flow through significant restrictions of the river, giving river narrows importance as well. Furthermore, at least two of these pool locations were situated at a transportation crossroad where a terrestrial trail met or crossed the river (the Clearwater River Provincial Campground and the McLean/Clearwater Rivers confluence). Five sites (HfOf-4, HeOh-3, HeOi-1, HeOi-8, and HeOi-6) were also located within a modern camping spot. There did not seem to be any correlation between finding sites and proximity to the Dina/McMurray formation, sharp bends, the height of the terrace/level landform, or portages. Although there were exceptions to most of these site indicators, future research along this river, and perhaps on rivers across the boreal forest region, may want to consider the following as being predictors of high site density: 1) well drained and level landforms; 2) locations adjacent to large pools within the river; 3) modern campsite areas; 4) locations at transportation crossroads, and; 5) river narrows.

7.4 Discussion of lithic resources

7.4.1 Local versus non-local lithic materials

Locally available quartz was by far the most common lithic material found during this survey (84% by count and 78% by weight; see Figures 6.17 and 6.18). As mentioned in subsection 2.8.2, it is most likely that quartz was a locally procured material in the Clearwater River survey area. It is also likely that the quartzite and chert found here are from local sources (subsections 6.3 and 7.4.4). The usage of local material in archaeological sites is often interpreted as signaling relatively limited mobility (Ambrose and Lorenz 1990; Bamforth

2006:524; Mitchell 2000:150; Risetto 2005); however, it is more likely that the converse is true here. Ethnohistoric data suggests that this river was used in the past by highly mobile Dené (subsection 3.6). Prior to its usage by the historic Dené, people who are represented by the Taltheilei archaeological tradition in northwestern Saskatchewan were also likely highly mobile hunter-gatherers who used this river valley (subsection 3.5.1; Gordon 1996). This archaeological and ethnohistoric evidence suggests that the pattern of high local lithic material use evident in the Clearwater River Valley was likely created by people living a highly mobile lifeway, for at least the past 2,700 years. The area's lack of significant quantities of non-local materials from more southern areas, such as brown chalcedony or Knife River Flint, suggests limited trade and interaction from that area; however, it is possible that future research may find significant quantities of non-local material that may contradict this interpretation. The quantity of non-local Beaver River Sandstone artifacts suggests a relatively strong relationship with people in the Athabasca River Valley and/or patterns of mobility that regularly extended to that area. Issues surrounding Beaver River Sandstone will be further discussed later in this chapter. Lower quality local materials are likely archaeologically overrepresented here because artifacts made from higher quality non-local lithic resources may have been curated and not discarded, while lower quality materials, such as quartz, may have been used more expediently. While obtaining high-quality lithic materials, either directly or through trade, may have been an important facet of the seasonal round of these people, the expedient use of locally available, lower quality quartz would have been embedded in the day-to-day life of mobile hunter-gatherers and therefore more archaeologically visible.

7.4.2 Observations of the fracture quality of clear quartz

Observations of the fracture characteristics of some of the quartz flakes during laboratory analysis may give some additional insights into this lithic material. In general, quartz is considered to be of poor knapping quality because it has too many fracture planes and is unpredictable (subsection 2.8.2; de la Torre 2004:439; Johnson 1999:31; Meyer 2010:27; Storck 2004:181); however, at least some of the clear and almost transparent quartz flakes found during this survey do not seem to have these undesirable knapping characteristics (Figure 7.1). Unlike the white quartz flakes found here that display angular fractures and visible planes of weakness, the fracture quality of the clear quartz flakes found throughout this survey, and especially at

HeOi-7, display much more desirable glass-like conchoidal fracturing, indicating that this material is of relatively superior knapping quality. This observation suggests that assuming all quartz has similar fracture qualities is erroneous, and some quartz, such as the clear quartz found during this research, should be considered higher quality. More in-depth research on this material should be conducted.

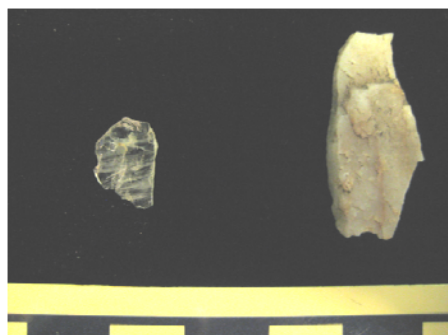


Figure 7.1. Clear quartz on the left, typical white quartz on the right

7.4.3 The distribution of Beaver River Sandstone and possible alternative source areas

Artifacts made from Beaver River Sandstone are well represented in our survey area, with its overall representation for the project being 6% by weight and 7% by count (see subsection 6.3.2; Figure 6.17); however, there is much variation in site-by-site representation, ranging from as high as 38% by weight at HeOi-3 (see subsection 5.2.12.2; Table 5.10), and as low as no evidence of usage. What appears to be a gradual drop-off of Beaver River Sandstone use in sites further from the likely source at the Quarry of the Ancestors may be explained as distance decay representing embedded procurement (Hodder 1974:173); however, it has been noted by Ives (1985:34) that the drop off for Beaver River Sandstone use is rapid in the Athabasca River Valley, and a 38% representation of Beaver River Sandstone would be considered higher than expected. One possible explanation is that Beaver River Sandstone may have been traded into the area. Another possible explanation is that there may be an alternative primary source for this material along the Clearwater River (Fenton and Ives 1982:188; Korejbo 2008a); however, the size of Beaver River Sandstone debitage found is more characteristic of mid-to later stage reduction and not of primary stage reduction, which would be expected near a procurement area. Furthermore, if there was an alternative source for this material within our study area, a much higher percentage of Beaver River Sandstone, similar to the almost exclusive

usage of this material in sites near the Quarry of the Ancestors, would be expected (Fenton and Ives 1982:176; Saxberg and Reeves 2003:295).

Alternatively, there may be a secondary source of Beaver River Sandstone found in glacial tills closer to our survey area than the Quarry of the Ancestors. The high frequency of Beaver River Sandstone artifacts at Saleski Lake and Peter Pond Lake would support this hypothesis (Hanna 1982:39, 59; Dale Russell, personal communication 2008; SARR, HcOi-2, 1979, Saleski Lake; Young 2006:268-269). Although the general direction of glacial movement in northern Saskatchewan was northeast to southwest, Richards and Fung map glacial movements as occurring in a northwest to southeast direction in the area just south of the Clearwater River and our survey area (see Figure 2.7; Richards and Fung 1969:50-51). If there was a continuous glacial movement from the Quarry of the Ancestors towards our survey area, it is possible that Beaver River Sandstone may have been deposited in glacial tills that are closer than the known primary source in Alberta. Unfortunately, Richards and Fung's map indicates that the direction of glacial movement northwest of our survey area is northeast to southwest (Figure 2.7; 1969:50-51); however, a later northeast to southwest glacial movement may have obscured a prior northwest to southeast movement in this area (Dyke 2004:374; Kupsch 1954:31). Bituminous blocks of Athabasca Tar Sand found in the Peter Pond Lake area suggest that a glacial movement may have transported tills from as far as the Alberta Oilsands area (Kupsch 1954). A secondary till source of Beaver River Sandstone may help to explain the higher than expected amount of Beaver River Sandstone Artifacts on the west side of Peter Pond Lake (Figure 3.1b; Young 2006:267-269).

Although natural geomorphological explanations are intriguing, cultural explanations for higher than expected Beaver River Sandstone distribution along the Clearwater River should not be dismissed. Beaver River Sandstone distribution along the Clearwater River in our survey area may be as a result of strong social connections between the people of the Athabasca River Valley around Fort MacKay and the people of the Clearwater River during some time in the past. This interaction may have involved some trade, including Beaver River Sandstone. Alternatively, these two regions may have been within the range of a single group of people who used the Athabasca and Clearwater Rivers as transportation corridors or some type of procurement zones throughout portions of their seasonal round. It is most likely that both of these scenarios may have occurred at different points in the past precontact history of the Clearwater River Valley.

7.4.4 The size and source of chert

The raw material source for chert artifacts found in this research project is also of interest. Limited quantities of comparable fine grained grayish/white chert artifacts are found throughout this survey area. Estimates based on the shape and size of the cortex on some of these flakes indicates that the original nodule size was similar to that of gravel, which is 2 to 50 mm in diameter (Clark 1998:175). Cortex found on many of the chert flakes in this project (23.5%) suggests that this material represents initial stages of reduction, which is characteristic of locally procured material (Holdaway et al. 2008:77, 80, 81); however, because of the small size of the original nodules, this material may have easily been transported great distances (Douglas et al. 2008:523). Furthermore, because of its high knapping quality, it is likely that this material would have been highly valued, and cortex may have been left on raw material in an effort to conserve it. Conservation of this material is further supported by the refitted flake from HeOh-1, which seems to have been intentionally burinated in spite of its extremely small size (Figure 6.5, Table 6.3).

7.5 Discussion of lithic technology

7.5.1 Heat treatment

Evidence for heat treatment, in the form of a reddish rind found on artifacts, was found at four sites in our survey area: HfOf-4, HfOh-1, HeOi-3, and HeOi-4. Eight of the nine artifacts displaying this characteristic were made from Beaver River Sandstone; one was made from chert. The heat treatment of some lithic materials, including Beaver River Sandstone and chert, improves its knapping quality (Ahler 1983:5; Domanski and Webb 2007:157-158; Gryba 2001:v-vii; Kooyman 2000:65; Luedtke 1992:95-96). Johnson believes that the heat treatment of quartz does not affect its knappability (Johnson 1998:9, 15-16); however, this is not universally accepted, and others believe that heat-treating quartz does increase its knapping quality (Domanski and Webb 2007:165). These researchers further believe that the identification of heat-treated quartz is rare because of a lack of obvious traits seen in this material after it has been heat-treated (Domanski and Webb 2007:165). In any case, heat treatment was only detected on Beaver River Sandstone and chert artifacts found during this survey. Concluding that that heat-

treated artifacts were primarily made from Beaver River Sandstone may be biased because of the ease of identifying this technological trait on this material, and the difficulty in observing it on other materials such as quartz.

Because heat-treated materials, such as Beaver River Sandstone, are more easily knapped and conchoidally fracture in a more predictable manner, it is likely that the heat treatment of lithic materials may be an adaptation to the sparseness of high-quality lithic materials in this area (Domanski and Webb 2007:167-168). Heat treatment would enable the knapper to more easily control the shape and form of the desired tool, or even control the manufacture of a more expedient sharp-edged flake with less wastage of valuable high-quality raw material. Occurrences of heat-treated Beaver River Sandstone are also found in the Fort MacKay region (Robertson et al. 2008).

7.5.2 Possible microblade technology

A microblade-like flake made from silicified mudstone was found at HfOh-1. Unfortunately, no microcores were found at this location which would support its intentional manufacture, and by definition, it may not be a true microblade. It is difficult to show that this flake was an intentionally created microblade without finding a prepared microblade core at this site, and the blade-like appearance of the flake may have been accidental; however, the flake found here has very parallel lateral edges and appears to have been snapped off at both its proximal and distal ends, supporting its identification as a microblade-like flake. Caution should be taken in that what appears to have been intentional snapping off of the ends may have also been as a result of unintentional post-depositional phenomenon, such as the piece being stepped on. Further possible evidence of microblade technology in our survey area is a chert core found at HeOi-1 that looks like it may have had microblade-like flakes removed from it (subsection 6.2.1; Figures 6.1, 6.2, 6.3). However, this is not a typical wedge-type microblade core (Younie 2008), and the blade-like negative flake scars may have been fortuitous.

As previously noted in subsection 2.8.1, artifacts made from Beaver River Sandstone in our survey area suggest a likely relationship with the Fort MacKay area of Alberta, where microblade technology has been confirmed (LeBlanc and Ives 1986; Stevenson 1986; Younie 2008; Magne and Fedje 2007). It would be a reasonable speculation that other cultural traits, such as knowledge of microblade production methods, may also be found here. Other

occurrences of microblade technology have been found at the Peace Point site in the Peace River Valley, at Lake Athabasca (Wright 1975:150-151 figure 3, 156-157 figure 8), and in the Armit River area (Low 1995a, b, c). The Parkhill Site, south of Moose Jaw, is another site where microblade technology occurs (Ebell 1980:114). Because of their proximity within the Mackenzie River drainage, a technological connection is most likely between sites in the Fort MacKay area and sites in the Clearwater River area, rather than with the Armit River or Peace River area.

Of particular interest with the debitage at HeOh-1 were the two pieces of chert that could be refitted (Figure 6.5). Together, these pieces suggest burin technology (subsection 6.2.3). Together, the refitted flake is only 2.29 x 1.5 cm, making it difficult to understand why the knapper would attempt to further reduce it. One interpretation, based on the size of the facet joining the two flakes, which is approximately 2.29 x 0.5 cm, is that it may have been a failed attempt to produce a small burin spall that would have been microblade-like in morphology (Barton et al. 1996:118; MacNeish 1954:244; Tomášková 2005:81, 87, 99, 105). The size of this spall would be similar to that of microblades found in the Fort MacKay area (Younie et al. 2010:85). This technology may be similar to what Mayer-Oakes (1986:111-116) defines as a burin spall core, or what Powers et al. (1983:119-122) define as a core burin, and these two pieces may represent the product of a specialized core that has been prepared solely for the intent of creating a useable burin spall, or microblade. A microblade-like flake successfully produced from this burin spall core could have been used in the same way as microblades manufactured from prepared microblade cores (Barton et al. 1996:118; MacNeish 1954:244). The fracture between these two pieces of debitage may have ultimately resulted in two pieces that were too small to be further used as cores, and thus discarded; however, this interpretation is highly speculative and more evidence is needed to support the use of core burins in this valley.

Microblade technology is similar to heat-treating technology in that it enables valuable lithic materials to be more efficiently used (Ames and Maschner 1999:71). Microblades can be used in composite tool technology where the sharp blades are inserted into bone projectile points or tools, thereby reducing the amount of lithic material needed to produce tools (Andrefsky 2005:32-33; Dixon 1999:190; Hare et al. 2004:264). Although the evidence for this technology here is intriguing, more evidence is needed to verify that this technology was used in the

Clearwater River Valley. Microblade technology, if confirmed in this area through further research, may be an adaptation to the sparseness of high-quality lithic materials in this area.

7.5.3 Microblades and cultural affiliation

The relationship between microblade technology and archaeological cultures is a debated question. It has been suggested that microblade technology in northeastern Alberta is affiliated with the Northwest Microblade tradition or the Denali Complex of northwestern British Columbia and southwestern Yukon (LeBlanc and Ives 1986:85-89; Younie 2008:178). It has also been suggested that there may be a relationship between microblade technology and a movement of Athapaskan people from the northwest into the interior of the continent, but the relationship seems far from clear or simple (Magne and Fedje 2007:184-188; Matson and Magne 2007:138-145). Reeves et al. (2011) believe that microblade technology in northeastern Alberta can be attributed to three different archaeological cultural complexes: Cody, Shield Archaic and Arctic Small Tool tradition. Alternatively, another hypothesis for the origins of at least some of the microblade technology in northern Alberta is that it may be a result of independent invention as opposed to diffusion or migration (Clark 2001:70). Although there are some good supportive arguments (Clark 2001:65; Magne and Fedje 2007:186; Reeves et al. 2011; Younie 2008), the use of microblades as a cultural marker is fraught with problems such as a relatively small sample size, disturbed sites and the inconsistency of this technology at specific cultural sites (Clark 1983:98, 99; Wright 1995:165). It has also been acknowledged that the use of different styles of microblade cores is highly dependent on the size and shape of the raw material from which it is made (Magne and Fedje 2007; 187), suggesting that differences in microblade core technology may be due to the availability of suitably sized raw material, as well as culturally determined manufacturing practices. This being said, it would be unlikely to find typical microblade cores in our survey area because chert, as the locally available high-grade lithic material most likely to have been procured in or near our study area, (subsection 7.3.4), was likely only available in nodules too small to manufacture into typical cores. The quality of some of the clear quartz used here may have been sufficient to manufacture microblades; however, there is was no evidence for its use for this purpose, and little is known of the original size of the raw material. The use of non-typical cores or core burins could be an adaptation to the lack of sufficiently sized raw material available in this valley to manufacture prepared microblade cores.

The use of core forms to suggest relationships with microblade using cultures here may be unrealistic. But, whether or not microblade technology in northern Alberta and northern Saskatchewan represents the Northwest Microblade tradition or the Arctic Small Tool tradition or another alternative, it is likely that this technology represents a northern cultural influence (Low 1995c:95; Magne and Fedje 2007:183-188).

7.6 Thesis summary

Facing many of the problems typical of boreal forest archaeology, the archaeology of the Clearwater River Valley is poorly understood. Currently, the Clearwater River Valley is the home of many different species of plants and animals, providing traditional resources for the Dené and Métis who live in adjacent areas. This river valley is situated between the Athabasca River of the Mackenzie River System and the Churchill River System, providing an important transportation route linking the two river systems during the fur trade period. It is likely that this river functioned similarly during its precontact past; furthermore, it is likely that the Clearwater River Valley may have provided enough of a subsistence base to allow for periods of seasonal habitation, especially during the winter. In fact, the Clearwater River Valley likely provided enough resources to facilitate seasonal gatherings.

As is typical of most archaeological investigations in the boreal forest, this research project attempts to address one of the basic archaeological goals in poorly understood areas; the clarification of culture history (subsection 3.1.5). Unfortunately, limited archaeological investigation in the Clearwater River Valley in general and our segment of it in particular requires the use of culture histories and archaeological investigations from adjacent areas to propose a culture history for our study area. During the Paleoindian period, archaeological cultures similar to those seen on the Northern Plains were present in northwestern Saskatchewan. The first archaeological culture of the Clearwater River Valley was likely the Fort Creek Fen/Goshen archaeological culture about 9,900 BP. Archaeological cultures represented by the Cody Complex and Lusk projectile points likely followed this initial occupation. The Middle Precontact period in northwestern Saskatchewan was represented by Early Side-notched, Oxbow, Hanna and Pelican Lake projectile points. Because of similarities between side-notched points from more southern areas and side-notched points from the Shield Archaic archaeological culture from the north, there is some question as to the nature of the side-notched points found in

northwestern Saskatchewan and the Oilsands area of Alberta (Reeves et al. 2011:28). Although Plains influence continued, influence from the northern archaeological cultures also become significant around 4,000 or 3,500 BP, with the arrival of the Northwest Microblade tradition, and/or the Pre-Dorset archaeological cultures. The Taltheilei archaeological culture, attributed to the ancestors of the modern Dené people who continue to live in the region, became important by about 2,700 BP. Evidence of Selkirk pottery in the Peter Pond area suggests cultural influence from boreal-forest-adapted Algonquian speakers from the east at about 700 to 200 BP. The Ethnographic and Historic period, beginning in the late eighteenth century, saw the Clearwater River used as an important transportation route for both Euro-Canadian/American fur-traders and Dené people. The Clearwater River Valley continues to be a traditional use area by Dené, Cree and Métis people living in northwestern Saskatchewan and northeastern Alberta.

In an attempt to increase the archaeological knowledge base of northwestern Saskatchewan, an archaeological survey employing subsurface and surficial methods was conducted on an approximately 50 km stretch of the Clearwater River from the Warner Rapids Bridge, to the bottom of Contact Rapids (Figure 4.1). Canoes, supported by air charter, were used to facilitate this survey. This survey located sixteen archaeological sites and one heritage site.

Of the 657 chipped stone artifacts found during this survey, 95% were classified as debitage. The remaining 5% were categorized as tools, including cores, retouched flakes, burins or pieces that display burin technology, FBR, endscrapers, broken bifacial tools, sidescraper, projectile point preform, and a possible microblade. Heat treatment was also detected on some of these artifacts. A majority of the chipped stone artifacts were manufactured from locally available raw materials. Beaver River Sandstone is the only material which is likely non-local.

7.7. Thesis conclusion

An important aspect of this research is an attempt to understand the culture history of northwestern Saskatchewan, and the role of the Clearwater River Valley. This project has increased the archaeological inventory of an important area, the Clearwater River Valley, in northwestern Saskatchewan. Although this project likely brought forth more questions than it answered, it has helped better define the nature of the archaeological resources here and lays some groundwork for future research.

Beaver River Sandstone found in this river valley suggests a connection with regions of the Athabasca River where this lithic resource's likely source is located; however, more research needs to be conducted to give us more confidence in claiming that only one source for this material exists. A future survey of the gravels and tills in areas suspected of containing secondary sources of Beaver River Sandstone, such as areas northwest of Peter Pond Lake (Figure 2.7), areas northwest of Lac La Loche, and areas in between the Fort Mackay region and our survey area (Figure 4.1), may help support or refute hypotheses suggesting alternative sources of this material.

Characteristics of clear quartz debitage here suggest that there may be a difference in knapping quality between clear quartz and the more common white quartz, and that at least some quartz should be considered relatively high quality. As discussed previously, this material may have been suitable for the manufacture of microblades; however, more research needs to be conducted in this area to verify the presence of this technology, as well as the nature and source of this quartz. Future experimental studies concerned with the knapping quality of quartz from different areas may help us understand the use of this material by ancient knappers. Cherts that are most likely local to this area are also of high-quality, suggesting that at least some higher quality materials may be available in the Clearwater River Valley. Future studies of tills and gravels close to our survey area may also help clarify the local vs. non-local nature of these artifacts.

Although no obvious culturally diagnostic artifacts were found here, microblade technology, if confirmed by future research, may indicate an influence from Northwest Microblade tradition and/or Pre-Dorset archaeological cultures from the northwest, and/or northeast. Future excavation of sites yielding possible microblade technologies, such as HfOh-1, HeOi-1, and HeOh-1, may find more evidence of this technology, as well as giving us more archaeological data to compare with known Northwest Microblade tradition sites and Pre-Dorset sites.

Technologies such as heat treatment and microblade technology were likely adaptations to the limited availability of high-quality lithic material; however, the detection of this technology on Beaver River Sandstone (subsection 4.2.2) and quartz artifacts is problematic (subsection 7.5.1). A methodology that would unequivocally detect this technology on these

different materials would be of great benefit and may help us better understand the use of heat treatment technology here.

It is likely that certain areas and archaeological sites found during this research were used as aggregation centres, or at least as fairly major base camps (subsection 7.3.1). It is likely that aggregation centres have been an important aspect of the social landscape of the boreal forest throughout its human history. These sites seem to have high archaeological visibility because of their large size, high artifact density, and more prominent locations at major transportation crossroads. Future research focusing on aggregation centres across the broader boreal forest area may contribute greatly to our understanding of ancient lifeways because of the importance that these people likely attributed to these sites, as well as the great variety of lithic artifacts that are generally seen at these sites. Areas suspected of being aggregation centres, such as the Warner Rapids area, McLean River confluence area and possibly the Skull Canyon area may produce our greatest gains in knowledge if they are further researched and/or excavated.

The section of the Clearwater River Valley that was surveyed during this research project continues to be used by surrounding aboriginal and Métis groups. The data collected from this research could help substantiate land use claims by these groups. Future archaeological research in this river valley could be directed towards the further examination of these land use claims. Archaeological research of this type would extend our knowledge of the use of this river by ancestors of these groups helping assess the cultural resource impact of development in northwestern Saskatchewan and northeastern Alberta.

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APPENDIX 1. CATALOGUE OF BRS ARTIFACTS

Catalogue #	Length	Width	Thickness	Weight	Color	Artifact type	Flake Type	Cortex	Heat-Treated	Dorsal Flake scars
HfOf-4-1	3.09	2.20	.52	3.3	grayish brown (10YR 5/2)	flake	tertiary	no	yes	5
HfOf-4-2	1.92	1.11	.50	1.4	grayish brown (10YR 5/2)	flake	tertiary	no	no	2
HfOf-4-3	1.79	1.29	.41	.8	grayish brown (10YR 5/2)	flake	tertiary	no	no	4
HfOf-4-4	1.55	1.37	.32	.3	grayish brown (10YR 5/2)	flake	tertiary	no	no	4
HfOf-4-5	2.18	1.69	.47	1.4	gray (10YR 5/1)	flake	tertiary	no	no	3
HfOf-4-6	1.70	.95	.30	.4	light brownish gray (10YR 6/2)	flake	tertiary	no	yes	4
HfOf-4-7	1.42	1.32	.25	.4	light gray (10YR 7/2)	flake	tertiary	no	yes	
HfOf-4-8	1.85	1.28	.25	.4	gray (5Y 6/1)	flake	tertiary	no	no	3
HfOf-4-9	1.04	.86	.19	.1	gray (10YR 6/1)	flake	tertiary	no	no	2
HfOf-4-10	1.32	1.20	.20	.1	light gray (2.5Y 7/1)	flake	tertiary	no	no	3
HfOf-4-11	1.06	.89	.24	<.1	light gray (2.5Y7/2)	flake	tertiary	no	no	2
HfOf-4-12	.68	.49	.19	<.1	light gray (2.5Y7/2)	flake	tertiary	no	no	
HfOf-4-13	1.27	1.14	.27	.2	light gray (2.5Y7/2)	flake	tertiary	no	no	3
HfOf-4-14	.85	.75	.18	<.1	light gray (2.5Y7/2)	flake	tertiary	no	no	5
HfOf-4-17	1.63	.96	.61	.6	light brownish gray (2.5YR 6/2)	shatter		no	no	
HfOh-1-1	1.55	1.16	.79	1.3	Gray (10YR 6/1)	endscraper		yes	yes	

Catalogue #	Length	Width	Thickness	Weight	Color	Artifact type	Flake Type	Cortex	Heat-treated	Dorsal Flake scars
HfOh-1-111	2.92	1.09	.57	1.1	very pale brown (10YR8/2) exterior, brown (7.5YR 5/2) darker interior color, black (7.5YR 8/2) darkest interior color	flake	tertiary	no	yes	
HeOi-1-129	1.14	.70	.24	.1	gray (2.5Y 5/1)	flake	tertiary	no	no	2
HeOi-1-130	.83	.64	.10	<.1	gray (2.5Y 5/1)	flake	tertiary	no	no	2
HeOi-1-139	3.14	2.19	1.70	5.1	light gray (5Y 7/1)	flake	tertiary	no	no	7
HeOi-1-140	3.54	2.28	.65	6.3	light gray (5Y 7/1)	core fragment?, worked flake?	tertiary			
HeOi-1-142	1.78	1.66	.25	.7	light gray (10YR 7/2)	flake	tertiary	no	no	4
HeOi-2-1	.80	.78	.12	<.1	light brownish gray (10YR 6/2)	flake	tertiary	no	no	2
HeOi-3-16	1.30	.96	.30	.3	light gray (5Y 7/1), w/strong brown staining (7.5YR 5/8)	flake	tertiary	no	yes	3
HeOi-3-17	1.68	1.20	.27	.5	light gray (5YR5/8)	flake	tertiary	no	no	
HeOi-3-28	1.30	.85	.30	.3	light gray (2.5Y 7/1)	flake	tertiary	no	no	2
HeOi-3-30	3.44	1.50	.71	2.5	light gray (2.5Y 7/1)	flake	tertiary	no	no	2
HeOi-3-31	1.27	.79	.20	.2	light gray (2.5Y 7/1)	flake	tertiary	no	yes	2
HeOi-3-36	1.41	1.09	.19	.3	light gray (2.5Y 7/1)	flake	tertiary	no	no (but maybe)	2
HeOi-3-37	1.24	.73	.19	<.1	light brownish gray (2.5Y 6/2)	flake	tertiary	no	no	
HeOi-3-38	1.25	.70	.22	.1	light gray (2.5Y 7/1)	flake	tertiary	no	no	3

Catalogue #	Length	Width	Thickness	Weight	Color	Artifact type	Flake Type	Cortex	Heat-Treated	Dorsal Flake scars
HeOi-3-39	1.10	1.00	.18	.1	light gray (2.5Y 7/2), there is a very dark gray stripe running through it (2.5Y 3/1)	flake	tertiary	no	no	
HeOi-3-40	.97	.73	.24	<.1	gray (2.5Y 6/1)	flake	tertiary	no	no	3
HeOi-3-41	.99	.87	.19	.1	light gray (2.5Y 7/2)	flake	tertiary	no	no	
HeOi-3-42	.88	.75	.19	<.1	light brownish gray (2.5Y 6/2)	flake	tertiary	no	no	2
HeOi-3-43	.95	.92	.19	.1	light gray (2.5Y 7/1)	flake	tertiary	no	no	3
HeOi-3-44	.85	.84	.14	<.1	light brownish gray (2.5Y 6/2)	flake	tertiary	no	no	3
HeOi-3-45	1.06	.81	.18	<.1	light brownish gray (2.5Y 6/2)	flake	tertiary	no	no	3
HeOi-3-46	1.28	.73	.19	.1	light brownish gray (2.5Y 6/2)	flake	tertiary	no	no	2
HeOi-3-47	1.28	1.0	.25	.2	light brownish gray (2.5Y 6/2)	flake	tertiary	no	no	3
HeOi-4-18	2.59	2.33	.38	2.7	light gray (2.5Y 7/2)	Retouched flake. Retouched on 2 sides (serrated edge)	tertiary	no	no	4
HeOi-4-19	1.50	1.26	.63	1.2	gray (2.5Y 5/1)	flake	tertiary	no	no	
HeOi-4-23	1.39	1.15	.20	.2	light brownish gray (2.5Y 6/2)	flake	tertiary	no	no	3
HeOi-4-49	2.39	1.72	.39	1.0		flake	tertiary			5
HeOi-4-50	5.00	1.12	1.00	5.5	light gray (2.5Y 7/1)	burin	tertiary	no	yes	